THE IRON AGE

Established 1855 New York, February 4, 1915 *Vol. 95: No. 5*

Purchasing for Scattered Factories

The System for Covering from One Office the Requisitioning, Purchasing and Receiving of Goods for Widely Distributed Factories

BY H. L. EVANS

A great many large manufacturing concerns operating two or more factories in different localities are confronted with the problem of conducting these several factories by means of a general executive staff with headquarters at the general offices. There is no doubt that this system is the most efficient and economical, provided, of course, that the proper men and methods are employed.

We are going to deal with this principle as applied to purchasing. It is a well-known fact that some large corporations after a very unpleasant and unprofitable experience with a general purchasing agent have been compelled to disorganize this office and place each separate plant on its own responsibility, on account of the utter failure of the purchasing staff to supply the demand for material. In a case of this kind production suffers heavily, due to shortages which occur from time to time, and the cost cannot always be estimated in dollars and cents. This condition does not signify that the fundamental principle is wrong, but simply that the situation has not been met in a practical way by the application of common sense methods.

We shall describe a system in use in a large manufacturing company having its general offices at Pittsburgh and operating factories in several cities. The purchasing agent, a man of wide experience in his line installed this system, and he is able, with the assistance of a stenographer and one general clerk, to supply the material needs and yet find time to devote to research work and fulfil any other duties of his office with ease and thoroughness. In *The Iron Age* of February 5, 1914, the author contributed an article on "Systematizing Purchasing," descriptive of a system for handling purchasing for the home factory. It is found expedient, for the sake of brevity, to omit the description of certain forms, namely: "Follow-Up Copy of Purchase Order" and "Store Room Material Record" which, while forming a part of this system, were previously treated and, not being affected by the introduction of other plants, their application is the same as before described. It will be noticed, however, that some of the other forms are very similar to those described in the article referred to above, but there is an interchange of routine which renders their treatment necessary in this article, or they are of such vital importance to the system as a whole that their omission might cause misunderstanding or confusion in the mind of the reader.

It is essential, in order to maintain the records properly in connection with a system such as we are going to describe that some person be designated at the

No. A 9876

REQUISITION TO PURCHASE

PLANT No. 1
Plattsburg, N. Y.

DATE July 23rd 1914.

ORDER FROM _____

SHIP VIA _____

QUANTITY	DESCRIPTION
20,000	$\frac{3}{8}$" x $1\frac{1}{8}$" Milled Steel Pins. B/P #478

DATE WANTED Sept. 15th. QUANTITY ON HAND 8,000

FOR DEP'T K

REMARKS These pins should be free from burrs. Last ones were pretty rough.

APPROVED *W. J. Howe* SUPERINTENDENT SIGNED E. J. Krome.

The Stores Department Authorizes the Purchasing Department to Make Purchases with this Form

factory to act in the capacity of material record clerk. He will be held responsible for the condition of stock and movement of purchased material at the factory and, in fact, will be the source of communication between the factory and general purchasing department on all matters relating thereto.

It will be understood that the forms herein described as belonging to plant No. 1 are exactly the same as used for the other several plants, excepting as regard color of the paper, it being advisable to employ different colors of paper in the forms used for different plants, so that they may be readily distinguished and confusion thus avoided.

The reader to understand this article better should bear in mind that the term purchasing department is identified with the general offices at Pittsburgh and is not a department of plant No. 1. Plant No. 1 will be referred to as the Factory, and identified with it are the following: receiving department, stores department, material record clerk.

Form No. 1, the requisition to purchase, is 5½ x 8 in. in size and printed in triplicate. It constitutes the purchasing department's authority for the issuance of purchase orders. Requisitions originate in the stores department, though there may be an occasional exception to this rule. The triplicate copy is retained there and placed on a Shannon board file in alphabetical order under material classification, as a reminder to the storekeeper that such a requisition has been issued. Original and duplicate copies are handed to the material record clerk, who will retain the duplicate and forward the original to the purchasing department, filing the duplicate on a Shannon board file temporarily in numerical order, pending receipt of copy of purchase order from the purchasing department, which will bear a notation of such requisition number. The requisition is then filed numerically in a vertical drawer file, the purchase order number being first noted thereon.

The purchasing department, on receipt of the original requisition from the factory, will issue a purchase order and file the requisition in numerical order in a vertical drawer file, noting first thereon the purchase order number. All requisitions should express the factory's needs definitely, to enable the purchasing department to place orders with intelligence and dispatch.

The factory should not write in the spaces above the double line, excepting the date, as these will be filled in by the purchasing agent for the information of the clerk who will write up purchase orders from the requisitions. The factory should fill in all spaces provided at the bottom of the requisition, as the purchasing department will be able to determine, by being advised of the date material is wanted and the quantity in stock, what attention should be given to the follow-up after purchase order has been placed to effect shipment of material in time to meet the factory's requirements.

The purchasing department should also know the approximate monthly requirements, to determine what quantity of material to purchase, the object being to carry on hand at all times a stock which is normal in proportion to the requirements of production.

Space opposite the word "Remarks" is provided for any suggestions the factory may have to offer, as affecting the placing of orders, possibly a criticism unfavorable to material received in previous shipments, or in fact any remarks of a special nature which might assist the purchasing depart-

OSWALD COMPANY
General Offices
PITTSBURG, PA.

PURCHASE ORDER No. A-10840

DATE August 2, 1914.

R. F. Eames Co.,

Salem, Ohio.

PLEASE FURNISH MATERIAL AS SPECIFIED, SUBJECT TO CONDITIONS AND TERMS HEREIN NAMED:
1. RENDER INVOICES IN TRIPLICATE.
2. MAIL ORIGINAL AND DUPLICATE INVOICES HERE; TRIPLICATE TO PLATTSBURG.
3. MARK ORDER NUMBER ON INVOICES AND PACKAGES.
4. PRICES MUST NOT BE IN EXCESS OF THOSE LAST QUOTED OR CHARGED.
5. NO ALLOWANCE FOR BOXING OR CARTAGE.

Ship to OSWALD COMPANY, Plant No. 1
PLATTSBURG, N. Y.

VIA Freight, Cheapest Way.

QUANTITY	MATERIAL
20,000	Cold Rolled Steel Milled Pins, ⅜" largest diameter x 1⅛" long overall, milled ⅜" on both ends to knife edge, on 45 degree radius. Edges and milled surfaces must be parallel end to end. In accordance with blue print #478, attached. Subject to rejection if not satisfactory. Price $8.25 per thousand, f. o. b. Salem. Delivery thirty (30) days, your quotation July 25th. Req. No. A-9876. Dept. K.

OSWALD COMPANY

PURCHASING AGENT.

Six Copies of the Purchase Order Are Made and Besides the Original They Are for: Purchasing, Receiving and Stores Departments, the Factory Office and the "Reminder Memo" in Purchasing Department

PLANT NO 1

Pins- Milled Steel

HOW USED: Two on. #8 1/2 ... 2¢ / Four " " 6

MATERIAL C.R. Steel — WEIGHT .025" each — MAX 20000 — MIN 5000

ORDER										REMARKS	INVOICE			RECEIPTS			REMARKS
ORDER NO.	NAME	DATE	QUANTITY	PRICE LIST	PRICE DISC'T	PRICE NET	UNIT	F.O.B.		DATE	QUANTITY	PRICE	DATE	QUANTITY	R.S. NO.	
A 10840	R.F. Barnes Co	1914 8/12	20000			82.5	M	Sh.	Good & Reliable Gauge 5/8/1	202.18	202.18	✓	9/11	202.36	#1263	3/8 x 1/4" AR 478
11761	Std. Screw Prod. Co	9/12	20,000			102.0	M	Phila.		9/28	20000	✓				" " " "

The Purchasing Department Keeps a Record of Purchased Material on 5½ x 9-in. Cards

ment in serving the factory to the best possible advantage.

The purchase order is printed in six copies, as follows: original, purchasing department, factory office, receiving department, stores department, reminder memo.

The purchasing department will, on receipt of the requisition from the factory, issue the purchase order, making a note of requisition number in the lower left hand corner. The two copies "purchasing department" and "reminder memo" will be retained in the purchasing department. Three copies, that of the "factory office," "receiving department" and "stores department" will be mailed to the factory and should be distributed to the departments designated.

The material record clerk, who will receive the factory office copies, will make postings of the orders daily on the material record card (described later), the classification for posting being noted on the order by the purchasing department, so that the material record cards at the factory will conform in alphabetical arrangement to the purchase record cards (described later) on file in the purchasing department. After postings are made at the factory office, the copy is placed temporarily in numerical order on a flexible ring binder, pending receipt of invoice denoting shipment, and then it is filed numerically in a vertical drawer file.

The receiving department copy should be placed on a Shannon board file in that department, arranged alphabetically by shipper's name, until receipt of the material, when it is taken off and filed permanently in a vertical drawer file.

The stores department copy should be placed on a Shannon board file in that department, arranged alphabetically by material classification, until receipt of material, when it is taken off and filed permanently or destroyed, there being no advantage in it.

The purchasing department copy goes through much the same routine as the factory office copy, being first posted on purchase record cards and then placed in numerical order on a flexible ring binder, pending receipt of invoice denoting shipment, after which it is filed alphabetically in a vertical drawer file. These copies can be gathered together in complete sets of 200 as they become completed, bound cheaply in book form, and placed on shelves in vault for future reference.

The use of the follow-up or reminder copy was described as stated in the article referred to.

The purchase record card is 5½ x 9 in. in size, fitting a standard drawer cabinet. It is a complete record of purchased material, maintained in the purchasing department, the information being transcribed on the card from the purchasing department copy of order, as stated. The information provided for at the top can be gathered and inserted at any convenient time.

Spaces "How used," "Material," "Weight," "Maximum and Minimum," are of value only where the factory is devoted to the manufacture of a specific article and the purchase of this material may occur from time to time. On cards covering record of purchase of miscellaneous items these spaces remain blank. This information is of much assistance where the nature of the company's business suggests its use.

The card shows a complete record of the order from the time it is issued until the material is received at the factory. The spaces provided for the price and f.o.b. point under the heading Order cannot always be filled in at the time order is placed, as very often prices have not been specifically quoted or agreed upon, but this information in such cases should be inserted when the invoice is received. The price column under the heading invoiee should not show any figures, but simply a check mark, as the price is invariably treated as a part of the order, and the invoice is checked against it.

The column remarks in the center of the card is used particularly for the insertion of credits which may be issued to correct price or to cancel charge for material returned, after the invoice has been received and posted. The column "Remarks" at the right hand side is for a full description of the material, which does not form a part of the index, and should be inserted at the time the copy of the order is posted.

On receipt of requisitions from the factory reference should always be made to these cards which, in furnishing a complete record of past transac-

MATERIAL RECORD CARD - PLANT NO. 1

Pins- Milled Steel

ORDERS				INVOICES		RECEIPTS			REMARKS
ORDER NO.	NAME	DATE	QUANTITY	DATE	QUANTITY	DATE	QUANTITY	R.S. NO.	
A10840	R.F. Barnes Co	1914 8/12	20000	9/1	202.18	9/11	202.36	#1263	3/8 x 1/4" AR 478
11761	Standard Screw Prod.	9/12	20000	9/28	20,000				" "

Record of Purchased Material Kept at the Factory

No. A 12673

RECEIVING SLIP

PLANT No. 1
Plattsburg, N. Y.

DATE Sept. 11th, 1914

RECEIVED FROM R. F. Eames Co.,
Salem, Ohio.

HOW REC'D Freight CHARGES $1.25 ORDER No. A-10840

NO. PIECES	DESCRIPTION	WEIGHT
20,236	$\frac{3}{8}$" x $1\frac{1}{8}$" Milled Steel Pins. to B/P #478	526#

CHECKED BY E.J.K. STOREKEEPER RECEIVED BY F. Hogge.

The Receiving Department Makes Four Copies of this Slip, One Each for the Purchasing, Stores and Receiving Departments and the Factory Office

tions, serve as a check against a purchase of unsuitable material and facilitate the placing of repeat orders.

The material record card is 5½ x 9 in. in size and fits a standard drawer cabinet. It is a record of purchased material, maintained at the factory, and serves the same purpose as the purchase record card on file in the purchasing department.

The material record clerk will post to these cards from "Factory Office" copies of orders under material classification, which is noted on these copies by the purchasing department. Columns providing for price and other details have been omitted, since the purchase record card on file in the purchasing department is complete, and such information is therefore not required at the factory.

REJECTED MATERIAL REPORT

PLANT No. 1
Plattsburg, N. Y.

DATE Sept. 11th 1914.

PURCHASING AGENT:
YOU ARE ADVISED THAT MATERIAL DESCRIBED BELOW HAS BEEN REJECTED AND IS HELD AWAITING DISPOSITION:

DESCRIPTION:
20,236 $\frac{3}{8}$" x $1\frac{1}{8}$" Milled Steel Pins

FROM WHOM REC'D R. F. Eames Co. P. O. No. A-10840
R. S. No. A-12673

REASON FOR REJECTION:
Ends are not milled parallel and in other respects not according to blue print.

REMARKS: Totally unfit for use.

(SIGNED) E. J. Krome.

The Rejected Material Report Originates in the Stores Department and One of the Two Copies Goes with the Receiving Slip to the Purchasing Department

The receiving slip is 5½ x 8 in. in size and is printed in four copies, as follows: purchasing department, factory office, stores department and receiving department.

The receiving department will write up these slips promptly upon receipt of the goods. The space "How received" should show whether the material is received by freight or express, and space "charges" should show the amount of carrying charges paid to the transportation company. In the event shipment has been prepaid, the receiving slip should be so marked.

The "Factory Office" and "Store Department" copies are sent to the storekeeper, along with the material. The purchasing department copy is sent to the material record clerk, to be held by him temporarily. The "Receiving Department" copy is retained by the receiving clerk and filed alphabetically by shippers' name.

The storekeeper will verify the quantity and description of material, as reported by the receiving department, approve the "Factory Office" copy and send it to the material record clerk, filing the "Stores Department" copy alphabetically by material.

The material record clerk, on receipt of the above, will compare same with the purchasing department copy, correct the latter if necessary, and forward to the purchasing department at Pittsburgh. By having the purchasing department copies of the receiving slips verified in this manner insures against delay in their final disposition, as they can be more safely accepted as correct. The material record clerk will enter the factory office copy on material record cards, showing date, quantity and receiving slip number, after which it is filed permanently in numerical order.

The purchasing department will, upon receipt of its copy, enter it on the purchase record card, showing date, quantity and receiving slip number, placing it temporarily on a Shannon board file in alphabetical order by shipper's name, to be matched up with the invoice after which it is filed permanently in numerical order.

Invoices will be rendered in triplicate, the original and duplicate being mailed by the shipper direct to the offices at Pittsburgh, and the triplicate direct to the factory. When received by the purchasing department, the duplicate will be at once filed away permanently in alphabetical order under the shipper's name,—a transfer case being suitable for this purpose. The original should go immediately to the proper clerk's desk for checking and posting.

A rubber stamp providing for the check of calculations and prices, receiving slip number and date, freight or express charges, etc., is

impressed on each invoice, and after this operation is completed the calculation should be checked.

The invoices are then entred on the purchase record card, and should at the same time be checked for prices, since the card will show price fixed at the time purchase order was placed, and if not, a comparison may be made by a glance over the card, which gives a complete record of any previous purchases of the same material. After calculations and prices have been checked the invoices are placed on a Shannon board file in alphabetical order under the name of the shipper and are ready to be matched up with the receiving slips.

Both the invoices and receiving slips now being filed in the same alphabetical arrangement, each separately, the process of completing them is simple. The clerk should now proceed with matching up by placing both files on the desk in front of him and going through them from A to Z, posting from receiving slips upon the invoices the transportation charges, receiving slip date and number, after which both are removed from the files. Invoices for which receiving slips are not on file or vice versa should not be removed. After invoices and receiving slips have been matched or completed the invoices should be approved by the purchasing agent, then listed alphabetically and passed to the auditor, a receipt being obtained for them. The receiving slips are retained by the purchasing department and filed numerically.

In the event an invoice falls into dispute over prices charged or for any other reason, a letter should be written requesting proper adjustment, the invoice being put on a Shannon file, with a copy of the letter attached, awaiting response. Invoices in dispute should never be returned to the supplier for correction, as confusion in the account, through misunderstanding or loss of such invoice, will result in most cases where this is done.

The triplicate copy, when received at the factory, should be given to the material record clerk, who will post it to material record cards and then to copy of order which is being held on a ring binder. If invoices cover only partial shipment, the date and quantity shown on invoice should be noted on the order copy, but if completing, the date only is noted, in which case the order is removed from the binder and filed permanently in numerical order. The invoice is filed alphabetically by shipper's name.

The rejected material report is 5½ x 8 in. in size, printed in duplicate and originates in the stores department. When material is received and sent to the storeroom a careful inspection should be made by the storekeeper during the process of checking, and should it be found that it is defective or unfit for any reason, the fact should be set forth in this report, which will be forwarded through the material record clerk to the purchasing department, accompanied by the receiving slip. In the event material is allowed to pass into stock and it should not be found until some time has elapsed that it cannot be used for the purpose intended, it will be necessary that all information provided for in the blank spaces be supplied to the purchasing department to assist in the identification and proper disposition of the material.

The duplicate copy of this report should be held by the material record clerk on a Shannon board file temporarily, pending disposition order from the purchasing department, after which it will be attached to and filed with receiving slip on which material was originally received. The purchasing

DISPOSITION ORDER
Rejected Material

PURCHASING DEPARTMENT
Pittsburg, Pa.

DATE Sept. 18, 1914.

PLANT NO. 1.
Plattsburg, N. Y.

THE FOLLOWING DESCRIBED MATERIAL:
20,236 ⅜" x 1⅛" Milled Steel Pins

REC'D FROM R. F. Eames Co. ON P. O. No. A-10840
R. S. No. A-12673

REJECTED BY REASON OF
Ends not being parallel and in other respects not according to specifications.

SHOULD BE DISPOSED OF AS FOLLOWS:
Pack and ship via P. R. R., Freight Collect, to R. F. Eames Co., Salem, Ohio. Mail B/L to them and furnish Purchasing Department with shipping memorandum.

(SIGNED) R. F. C.

The Form for the Disposition of Rejected Material Originates in the Purchasing Department and Is Instruction to the Factory

No. A-48

ADVANCE ORDER

OSWALD CO. PLANT No. 1
Plattsburg, N. Y.

DATE _____

PLEASE FURNISH MATERIAL AS SPECIFIED
Do Not Invoice From This Order.
Formal Purchase Order Will Follow.

QUANTITY	DESCRIPTION

SIGNED _____

In the Event of Urgency for Material the Factory Meets Its Needs Before the Formal Purchasing Order Ensues by Use of this Advance Order Blank

department will file their copy in the same manner.

The form for the disposition of rejected material is 5½ x 8 in. in size, printed in duplicate. It originates in purchasing department. It instructs the factory as to disposition of material which has been rejected and the original copy which is sent to the factory should be attached to and filed with receiving slip in the same manner as copy of rejected material report.

An advance order or miscellaneous purchases are covered by a 5½ x 8 in. form printed in duplicate. It will often be necessary for the factory to purchase locally miscellaneous small items of material to fill urgent demands. To meet this condition and yet not disturb the routine of purchase orders or invoices, the factory will issue an advance order for any material which they may require in an emergency. The supplier will furnish the material and hold the order, as instructed, awaiting receipt of formal purchase order before rendering invoices. The factory will, in all such cases, issue to the purchasing department the regular form requisition to purchase, making note on this requisition that the material covered thereby has already been purchased (stating from whom) on advance order (quoting number), and the purchasing department will issue direct to the supplier a formal purchase order in confirmation. Thus all purchases will be made a matter of record and invoices directed through the proper channels. This does not apply to sundry articles which can be bought at retail stores and paid for out of petty cash but to items of productive material or factory supplies not regularly carried in stock, such as fittings, bolts, screws, pulleys, etc., which are obtained from jobbers or through established business houses.

It is desirable, however, to reduce these local purchases to the minimum and to confine the business to as few concerns as possible, to facilitate the handling of accounts in the accounting department.

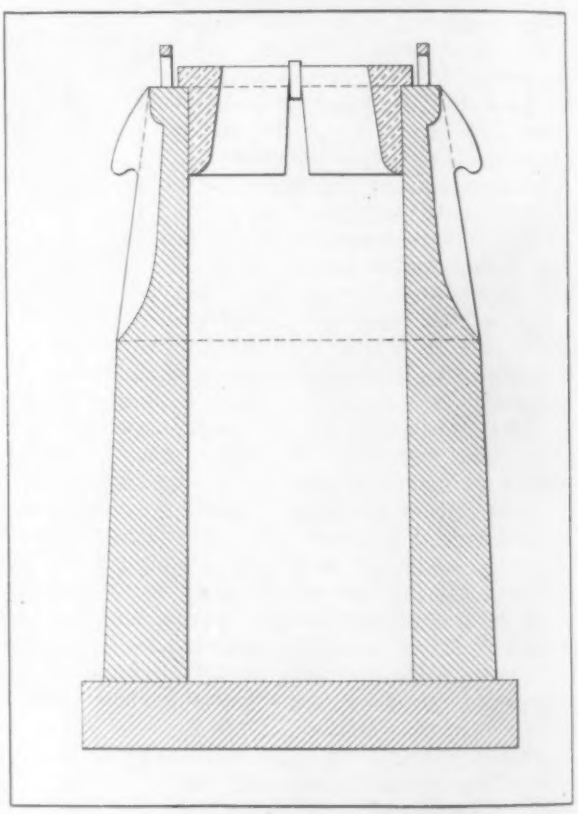
The duplicate copy of advance orders should be filed away for future reference, as it might be desirable to determine the volume and class of material covered by local purchases during any given period of time.

We would call attention to the fact that the 5½ x 9 in. and 5½ x 8 in. forms can be vertically filed in a cabinet known as "legal blank size" of three-drawer capacity. The rejected material report and disposition orders being attached to receiving slips to which they refer may all be carried in one drawer, while the requisitions are carried in another. The third drawer will accommodate the purchase record card, though if the business is large the purchase records will naturally increase in volume until it might be necessary to have one or two three-drawer units devoted to these cards alone, subdivided alphabetically. The other forms may be transferred to the vault or other place for old records after a certain period of time, when the need for reference to them would seem unlikely.

The system of filing the different forms in the purchasing department by number is by far more desirable than either by name or material, since they may be filed more quickly and accurately and can be located more easily when it is necessary to refer to them. If the party desiring information regarding a certain purchase order, requisition or receiving slip has in mind the number, then any of these forms may be located by direct reference. If the number is not known then it will be necessary to refer to the purchase record card under the heading of the material in question, which will give the order and receiving slip numbers, and requisition number may be found by reference to copy of order, on which this number is invariably noted. The same remarks would apply to the system of filing corresponding forms at the factory.

The Gathmann Ingot Mold

The Gathmann mold for casting steel ingots has recently been patented (U. S. 1,117,181—November 17, 1914). The inventor, Emil Gathmann, of Baltimore, states that in a mold in which provision is made for conserving the heat of the molten metal in its upper portion and for promoting the cooling of the lower part of the ingot, supplemented by the use of a feeder or sinkhead, improved results can be obtained, since a sufficient supply of molten metal is provided to fill the pipe until solidification takes place. This is accomplished by so constructing the mold that the walls progressively decrease in thickness from the bottom to the top by being made thick and highly absorptive. The



The Gathmann Ingot Mold with Riser

walls of the mold are so made that the line of rapid cooling of the ingot extends upwardly to approximately 75 per cent. of the mold's contents, the remainder being much thinner as shown by the illustration. With a mold so constructed, Mr. Gathmann finds that the casting of a sound ingot is promoted by placing in the upper end of the mold a feeder or sinkhead of insulating material, such as fire clay, which not only acts as a feeder for the mold but also assists in conserving the heat of the ingot at its upper end. The sinkheads are specially constructed in four sections adapted to fit the cavity. Any great variations from these measurements do not give the best results.

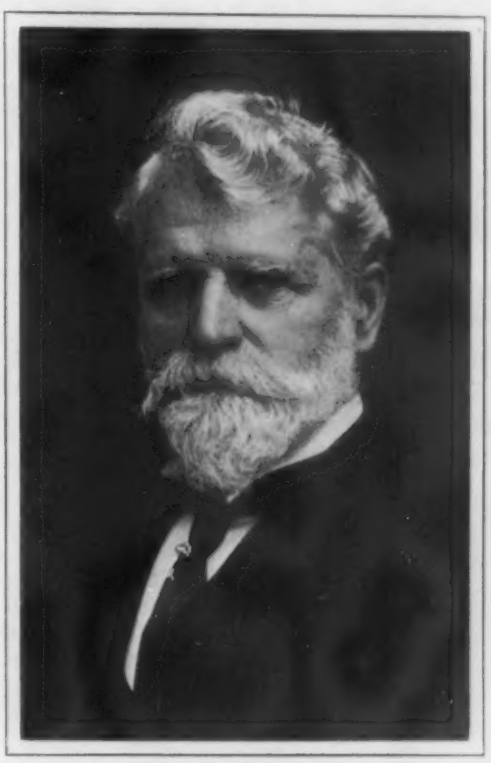
The 25th anniversary of the Southern Hardware Jobbers' Association and the 26th convention of the American Hardware Manufacturers' Association will be held jointly in New Orleans, La., April 20, 21, 22, 23, with headquarters at the St. Charles Hotel.

An Engineering Foundation Established

Ambrose Swasey Gives $200,000 as the Initial Contribution to a Fund for Furthering Research in Science and Engineering

Ambrose Swasey, president of the Warner & Swasey Company, Cleveland, builder of turret lathes and other metal working machines, long conspicuous for his contributions in mechanism of precision, particularly to the astronomical world, and a past president of the American Society of Mechanical Engineers, has given $200,000 to the engineering profession as a fund for research. A few weeks ago mention was made in these columns of a meeting to be held in New York City, on the evening of January 27, for formally receiving the gift and announcing the benefactor. Meanwhile arrangements had been under way for taking care of the fund, so that it could be regarded as the initial contribution to a foundation calculated to be of direct value, not alone to engineering as a profession, but to engineering and science as these have expression in industry.

How the fund may possibly be employed is indicated in the phraseology of the establishment of what has been called the Engineering Foundation, and a sidelight is contained in one of the formal features of the acceptance, the address of Dr. Henry S. Pritchett, given in part below. Throughout the speeches, particular emphasis was placed on the desire of the donor not to be conspicuous as the contributor of the fund, a fact which is borne out in the naming of the foundation, and on the expectation that the present fund is the first contribution to an object which it is hoped will bring out other donations from time to time. The offer was apparently made to the United Engineering Society, which operates the building presented some years ago by Andrew Carnegie to the American Institute of Electrical Engineers, the American Society of Mechanical Engineers and the American Institute of Mining Engineers, known as the Engineering Societies Building. The United Engineering Society then provided by amendments to its charter and by-laws to allow for the establishment of the Engineering Foundation, and arranged, on the acquiescence of co-operation by the American Society of Civil Engineers, that the fund be controlled by an Engineering Foundation Board, made up of representatives of these four national engineering societies, as well as two members at large, the last two not necessarily members of any of these societies. In the by-laws it is stated that "the Board may use any part of its funds and in any manner which it deems proper for the furtherance of research in science and engineering, or for the advancement in any other manner of the profession of engineering and the good of mankind. The Board may, by publication or public lectures or by other means, in its discretion, make known to the world the result of its undertakings."



AMBROSE SWASEY,

Whose large gift brought into being the Engineering Foundation

At the inauguration ceremonies, addresses were made by Gano Dunn, of the J. G. White Engineering Corporation and president of the United Engineering Society; Dr. Henry S. Pritchett, president of the Carnegie Foundation for the Advancement of Teaching; Dr. Robert W. Hunt, Robert W. Hunt & Co., Chicago, and past president of the American Institute of Mining Engineers, and Dr. Alexander C. Humphreys, president of Stevens Institute, Hoboken, N. J., and past president of the American Society of Mechanical Engineers. There was nothing conspicuously formal about the occasion. It came to Mr. Dunn, who presided, to disclose the identity of the donor, and in closing his introductory address, he asked Mr. Swasey to say a few words. In these remarks Mr. Swasey showed his desire for self-effacement in that he devoted himself altogether to commending those who have arranged for managing the foundation and had given it the name Engineering Foundation. There were some fifteen or twenty besides the speakers and Mr. Swasey seated on the stage, including Charles F. Rand, president Spanish American Iron Company, New York; James Harkness, president Jones & Lamson Machine Company, Springfield, Vt., and past-president of the American Society of Mechanical Engineers; B. B. Thayer, president Anaconda Copper Mining Company, New York; John E. Sweet, president Straight Line Engine Company, Syracuse, N. Y.; Jesse M. Smith, past-president of the American Society of Mechanical Engineers; Dr. Joseph Struthers, Johnson Electric Smelting, Inc., New York; Bradley Stoughton, secretary of American Institute of Mining Engineers; Prof. C. F. Scott, Yale University; H. H. Barnes, General Electric Company, New York; John W. Lieb, New York Edison Company; Calvin W. Rice, secretary American Society of Mechanical Engineers; A. R. Ledoux, New York City; Charles Macdonald, past-president of the American Society of Civil Engineers; Charles Warren Hunt, secretary of the American Society of Civil Engineers; C. O.

Mailloux, past-president of the American Institute of Electrical Engineers, and Dr. John A. Brashear, president of the American Society of Mechanical Engineers.

POSSIBILITIES OF THE FOUNDATION

Dr. Pritchett in his address said that while great numbers of research institutes already exist in Europe and America, never has such an agency for research been placed in the hands of a group of engineering societies. "The process of research as one may expect it to be carried forward by such an agency as this, involves," he said in continuing, "first, the clear formulation of problems and then the attack upon the problem by those men who have learned to think, who are familiar already with the present state of science, and who—using this as a basis—push forward the boundaries of our knowledge into new fields." As to what the Foundation may mean, Dr. Pritchett said:

"To the public the foundation of such a research agency in the field of applied science may well mean the inauguration of a series of studies having the greatest significance for public well-being and for public needs. The most striking illustration of such a result has been already given in the history of a small research laboratory of applied science, started in the technical school, at Charlottenburg, some forty years ago. The effort arose out of the questions formulated and laid before the scientific staff of the technical school by the men of the steel industry; and out of the solutions of these questions the steel industry of Germany grew. Gradually the inquiry arose, why should there not be an institute of engineering research to which any citizen engaged in the industries may bring his problems, to whose laboratories may be brought not alone the questions relating to the manufacture of steel, but those relating to the chemical industry, textile industry, electrical manufacturing and industries of every sort, in a word, all the questions which to-day in the manufacturing establishments of a great nation are constantly being asked? Out of the little research laboratory at Charlottenburg have grown the great testing laboratories covering many acres and offering themselves freely to the solution of every technical question that the industries in Germany can present.

"Any company engaged in manufacturing work may bring its problems here. Any experts may come in and take part in the study, all the literature on the subject is made available, and under the combined efforts of the expert of the government laboratory and the experts of the industry a solution is generally found.

"Dr. Martens, the director of the research institute at Gross Lichterfelde, told me that the complete and orderly collection of scientific literature and of scattered scientific solutions in research made available at Gross Lichterfelde was one of the great factors in the success of the research establishment. 'Four times out of five,' said he, 'when a manufacturer brings us a problem, we find that it has already been solved somewhere in the world by somebody, but by someone who generally used the solution in a different connection. Our greatest service is to place at the disposal of the inquirer the entire literature of his subject, and in this he will generally find a solution of his question already made.'

"Who can tell but that this modest agency for research, under the direction of the great engineering societies of America, may develop in due course into a national establishment to which any man in the industries may bring his problem with full hope of solution?"

MR. SWASEY'S CAREER IN BRIEF

Ambrose Swasey was born in Exeter, N. H. At the age of 18 he entered upon the machinist's trade in Exeter, and in 1870, in company with his present partner, Worcester R. Warner, he entered the employ of the Pratt & Whitney Company, at Hartford, Conn. While in charge of the gearing department, he invented and perfected the epicycloidal milling machine for gears. In 1880, he resigned his position with the Pratt & Whitney Company and, together with his present partner, established in Cleveland, Ohio, the business which has since grown to large proportions.

In an account of Mr. Swasey's life in Cassier's Magazine in March, 1897, Dr. John A. Brashear made some comments which are of peculiar interest at this time: "It seems a most fortunate circumstance that these two men, Ambrose Swasey and Worcester R. Warner, should have associated themselves together as partners, for although the making of astronomical instruments was not in their original scheme when starting the business of machine construction, Mr. Warner's taste for astronomy, and his interest in the appliances used by astronomers, combined with Mr. Swasey's love for artistic design and his ability as a mechanical engineer, very naturally led them to take hold of the questions pertaining to such instruments." Among the instruments which they have designed are the famous Lick, Yerkes and United States Naval Observatory telescopes as well as the 72-in. reflecting telescope now under construction for the Canadian Government.

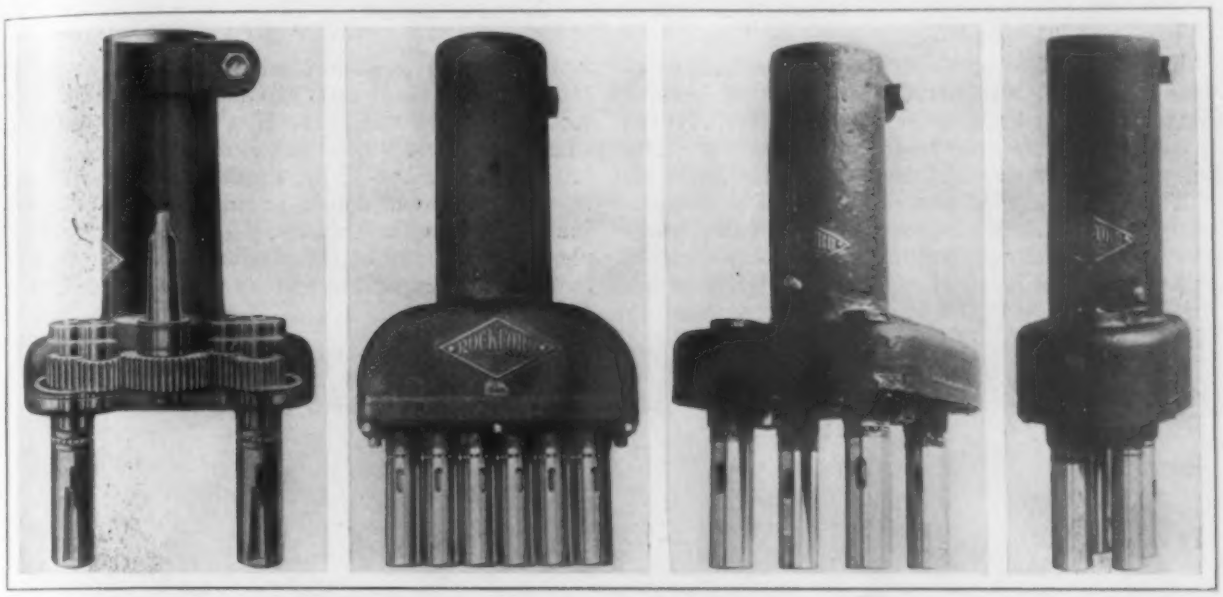
Mr. Swasey is, as stated, a past-president of the American Society of Mechanical Engineers, a member of the Institution of Mechanical Engineers of Great Britain and of the British Astronomical Society, he is a Fellow of the Royal Astronomical Society, is past-president of the Cleveland Engineering Society, and, in 1900, received from the French Government the decoration of the Legion of Honor for his achievements in the design and construction of astronomical instruments. He was a member of the Jury of Awards of the Nashville, the Pan-American and the St. Louis Expositions and vice-president of the Jury of Awards of the Jamestown Exposition. In 1905 he served as president of the Cleveland Chamber of Commerce, and the same year the degree of Doctor of Engineering was conferred upon him by Case School of Applied Science. Mr. Swasey was married October 24, 1871, to Lavina D. Marston, and he and Mrs. Swasey had traveled extensively up to the time of Mrs. Swasey's death early in 1913.

The Union Steel Corporation of South Africa

The development of the South African iron and steel industry is outlined in the annual report of the Department of Mines and Industries of the Union of South Africa, Parts III and IV. The manufacture of steel and iron from steel and iron scrap has been actually started by the Union Steel Corporation of South Africa, Ltd., at Vereeniging, as a result partly of Government inducements. Rolling was commenced August 1, 1913, and from an open-hearth furnace on September 1, 1913, was poured the first steel ingot made in that country. The company's full equipment comprises a 12-ton open-hearth furnace, a 600-ton press, two Siemens reheating furnaces and a 12-in. rolling mill. The buildings are inclosed by galvanized corrugated iron. The products consist of bar iron and steel of all sizes, fencing standards, light mine rails, etc. Men employed embrace 100 Europeans and 90 natives, most of the skilled ones being English. The output of the plant has not reached its maximum. Difficulties in disposing of the product are mentioned.

Auxiliary Drilling Machine Heads

A line of auxiliary heads for use on drilling machines where it is desired to handle a number of holes simultaneously at high speeds has been placed on the market by the Rockford Drilling Machine Company, Rockford, Ill. The heads are intended for use with vertical and horizontal machines. The spindles may be set in a straight line around the circumference of a circle or staggered to suit, and either stationary or adjustable spindles can be provided. The length of the spindle sleeve can also be arranged to take care of drilling operations on different levels. In the accompanying illustration the internal arrangement of a two-spindle head of the stationary type is shown at the left, and the other three views, from left to right, are a six-spindle head with the spindles arranged in a straight line, a large four-spindle head and a four-spindle head with the spindles grouped closely together.



Views of a Recently Developed Line of Auxiliary Heads for Drilling Machines Designed To Permit Various Arrangements of Multiple Holes To Be Drilled Simultaneously and the Mechanism Employed To Secure This Result

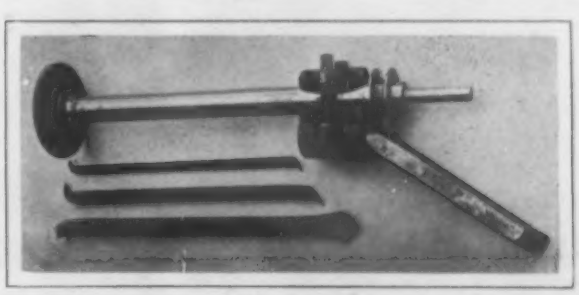
The heads are attached to the regular spindle of the drilling machine, the shank entering into the hole of the machine spindle. This shank drives a gear, which, as will be noticed from the view at the left of the illustration, transmits power to the spindles of the head through gears. Upper and lower bearings are provided for the gears and the main spindle of the heads. These are bushed with phosphor bronze and are arranged to provide for the taking up of wear due to the thrust of the gear. Ball thrust bearings are provided for all of the spindles. The gears are made from hardened tool steel or phosphor bronze, the driving and driven gears being of steel, while the intermediate ones are of bronze. The spindles are made of high-grade steel and can be furnished with taper holes with a drift slot, a straight hole with a set screw or any type of chuck. All the bearings have a lubricating system. The auxiliary heads with stationary spindles are made oil tight, and the castings can be filled with light grease or oil. The adjustable type is made as nearly oil tight as is possible, and in most instances the casings are filled with grease.

The Texas Industrial Congress, of which E. W. Kirkpatrick, Dallas, Texas, is president, announces its fifth annual offer of $10,000 in cash prizes to the farmers of that State to encourage the adoption of better agricultural methods, the increased production of livestock and the cultivation of home and school gardens.

A Combination Adjustable Tool Holder

George F. Krieger, Grand Rapids, Wis., has recently brought out a tool consisting of a combination adjustable lathe, drilling and milling machine, boring and grinding tool holder. It is intended for use in connection with his adjustable lathe boring tool holder in manufacturing plants, repair shops, tool rooms or garages. The particular field that the holder is designed to cover is jobs that cannot be swung in a lathe, such as the frame of a machine, large jigs where accurate holes have to be bored, crank rods, etc.

The special feature about the new holder is the use of a taper shank which fits into a drilling or milling machine. An eccentric wrist pin, used in connection with the taper shank, enables the head to swing, so that holes ranging from ½ to 6 in. in diameter can be bored. The head is interchangeable on the different shanks that are used in any of the metal working machines with which it is designed to be employed.



A New Combination Adjustable Lathe, Drilling and Milling Machine, Boring and Grinding Tool Holder

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A Stainless Non-Rusting Steel

A new steel, claimed to be non-rusting and untarnishable, and called Tirth's stainless steel, has been introduced by a Sheffield, England, firm, according to United States Consul John M. Savage, of that city, in Commerce Reports. The new metal is especially adapted for table cutlery and requires only ordinary washing to clean it. It is said to retain a keen edge resembling that of double-shear steel, also that the properties are inherent and not due to any treatment. The price is reported to be 26c. per lb., or double that of the usual steel for the same purpose. It also costs more to work up.

Micrographic Inspection of Steel

What the United States Navy Has Done in Fixing Causes of Failures by Microscopic Examination

The United States Naval Experiment Station at Annapolis, Md., was established in 1908, and at the time it was regarded as the greatest advance in naval efficiency ever made. In an article, "The Engineering Experiment Station, Some Results," by Lieutenant H. G. Bowen and Leo Loeb, mechanical engineer, published in the Journal of the American Society of Naval Engineers, the achievements of the station in its brief existence are given in detail as well as a delineation of the intimate connection existing between the station and the fleet. Topics such as coal, lubricants, corrosion, feedwater heaters, boiler feed pumping, etc., are discussed and the investigations reported. Of special importance is the portion dealing with the metallographic work of the station, which has a very fine microscopical and metallurgical laboratory. Some extracts are made below:

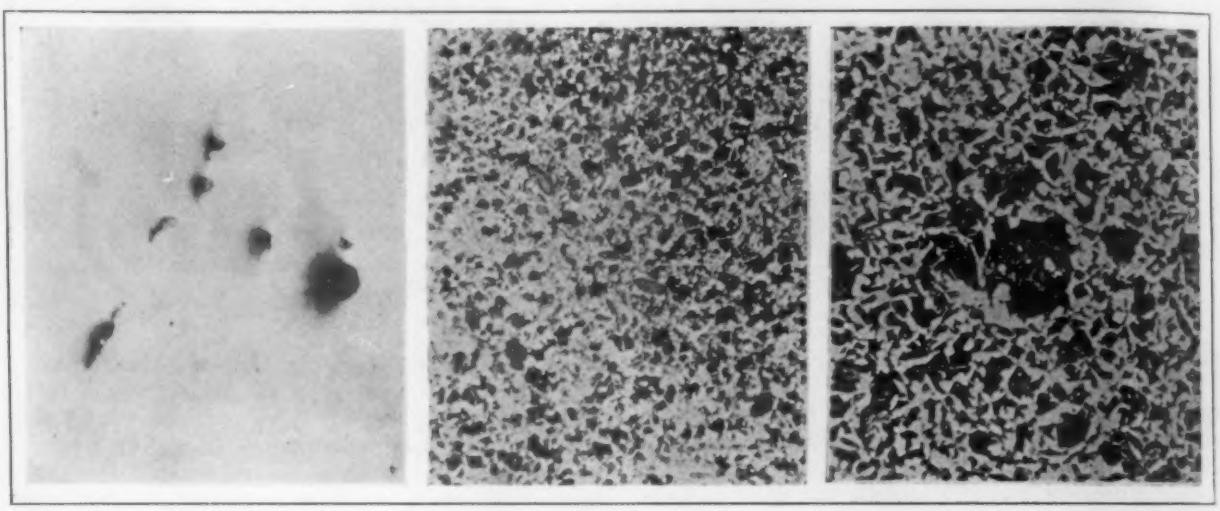


Fig. 1—The Connecticut's Crankshaft, Unetched Portion Showing Slag and Manganese Sulphide Inclusions

Fig. 2—The Connecticut's Crankshaft, Etched Portion Showing Structure and Manganese Sulphide Inclusions

Fig. 3—Ruptured Propeller Shaft of the Connecticut Showing Unequal Distribution of Ferrite

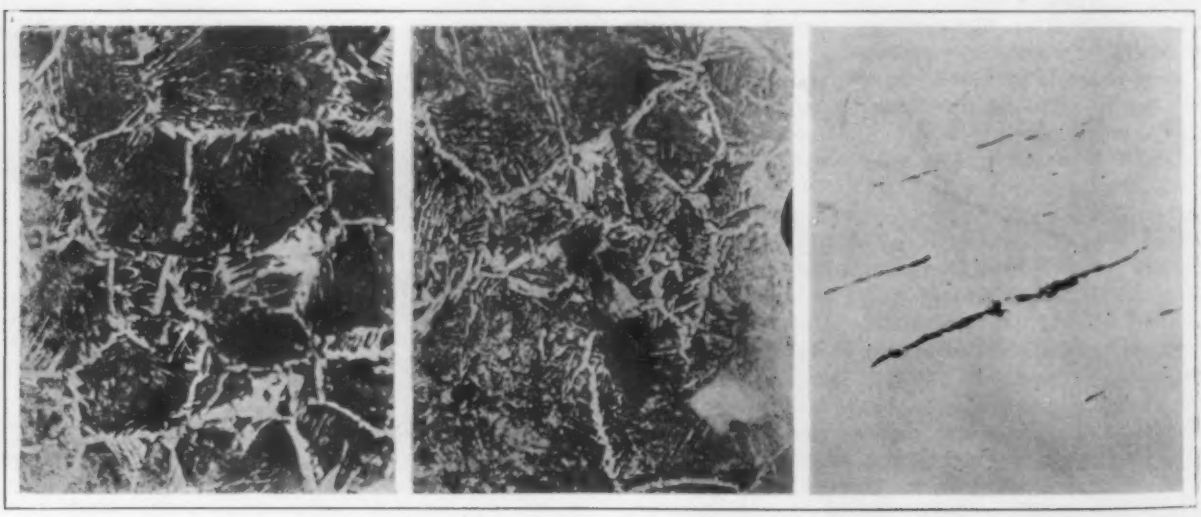


Fig. 4—Section of Crankshaft from the C-4, Etched, Showing a Crack Along the Cell Walls

Fig. 5—Section of a Crankshaft from the C-4 Showing Coarse Grain Size and Slag Inclusions

Fig. 6—Section of Crankshaft from the C-4, Unetched, Showing Slag Inclusions

To the experiment station belongs the credit of introducing to the naval service metallography, an art which, though still in its infancy, has done more than any other to clear up questions of metallurgical structure and processes of manufacture tending toward the prevention of failure of metal in service. The time is not far distant when every important member of the propelling apparatus will have been subjected to a photomicrographic examination before acceptance. The development of photomicrography at the station has been attended by results as important as they are startling. Time and time again the blame for the failure of metal has been traced thereby to defects in the manufacture.

Figs. 1 and 2 show photomicrographs of the battleship Connecticut's broken crank shaft. It will be noted that the crystallographic structure of the metal is not unusual. The slag inclusions of manganese sulphide and iron sulphide are marked. The failure of the metal is attributed to the presence of this slag together with its unequal distribution. The specific gravity of MnS is half that of steel, so that if the metal had been allowed to

stand longer before pouring the MnS would have risen to the surface and could have been skimmed.

Fig. 3 shows a photomicrograph of a ruptured propeller shaft of the Connecticut, revealing great patches of ferrite (white) and pearlite. Where ferrite is thus segregated, steel is no stronger than wrought iron.

Physical tests made on specimens of the shaft after fracture when compared with tests made before fracture show that the shaft had fallen off somewhat in its tensile strength, elastic limit, etc. But the conclusion is inevitable that the annealing temperature, 1425 deg. F., to which the manufacturers subjected the shaft was too slow to produce a grain structure well able to resist alternating stresses. Furthermore the slag inclusions, occurring as they do in the relatively weak ferrite areas, still more reduce the strength and life of the shaft.

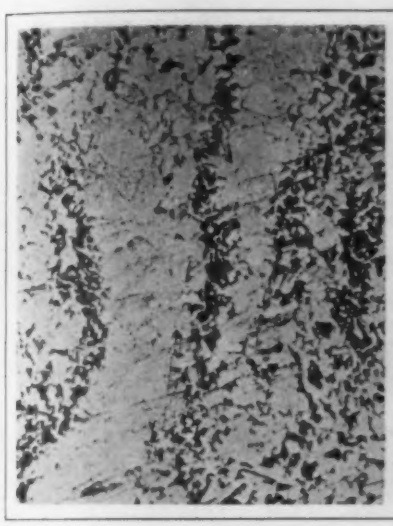


Fig. 7—Section of a Steel Plate from a Mosher Boiler Drum Showing Segregation of Ferrite and Pearlite

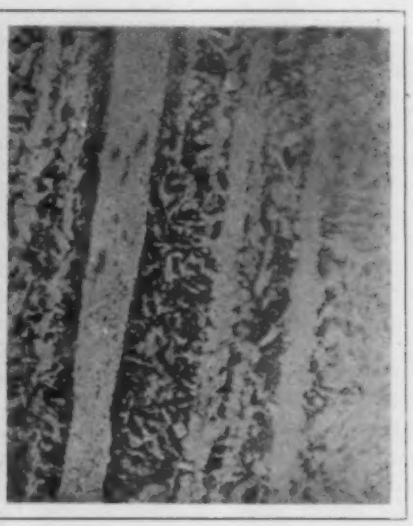


Fig. 8—Section of Same Drum as Fig. 7 Showing Structure Near the Edge of the Rupture

Figs. 4 and 6 are photomicrographs of a crank shaft from the C-4. Fig. 4 shows a crack following the cell walls. The cells are pearlite and the walls are ferrite; the crack is through the weaker ferrite. Fig. 5 illustrates coarse-grain size and slag inclusions. Fig. 6 is the photomicrograph of a specimen polished but not etched, showing the slag inclusions still more plainly. This crank shaft failed due to impurities and faulty heat treatment. The faulty heat treatment is responsible for the large grain size.

Several water drums of Mosher boilers have been ruptured in service and the cause is made apparent from a photomicrographic examination. In the process of manufacturing, the drums are cold-pressed into shape from steel plates and this cold working was not followed by annealing. As a result one would expect segregation and elongated grain. Fig. 7 plainly shows segregation of ferrite and pearlite in a Mosher boiler drum. Fig. 8 shows the structure near the edge of the rupture. The distorted and elongated grain due to cold working is evident.

Of the 34 establishments in the United States making chemical and metallurgical products by electricity New York State had 18, with Michigan 5 and Pennsylvania 3, according to the thirteenth census of the United States. New York's production was valued at $13,401,878 or 72.6 per cent. of the total. The most important class of products, as measured by value, was metals and alloys which contributed 41.5 per cent. of the total value and comprised aluminum, silicon, ferrovanadium, ferrosilicon, ferrotitanium, cuprovanadium, etc.

The Best Bar for Testing Cast Iron

The object of an investigation dealt with in a paper on "The Transverse Testing of Cast Iron," prepared by George Hailstone, of Birmingham, England, for the Iron and Steel Institute, London, was to determine the cast-iron test bar that should be used to obtain the most reliable and consistent results with breaking load and deflection, also the relation that exists between the two English standard test bars. The material used was cast iron of fairly good quality, but of the non-chilling type, melted in the cupola. The bars, 1⅛ in. x 2⅛ in. x 50 in. long, were poured from the same ladle and cast in green sand molds horizontally, the down and in gates being of the same size. After remaining in the sand until the next morning, the bars were cleaned and machined down to 2 in. x 1 in. sections.

The results of the research are stated in the conclusions: The best standard cast-iron test bar to give the most consistent and comparable results both in breaking load and deflection is one 1⅛ in. x 2⅛ in. in section, 42 in. long, machined down to 2 in. x 1 in. in section and tested on 36-in. centers. The rate of testing should not exceed a load of 1 cwt. in less than 15 sec.

Instead of the ratio, as hitherto thought, of the 2 in. x 1 in. bar, tested on 36-in. centers, to the 1 in. x 1 in. bar, tested on 12 in. centers, being 1.333 times the breaking load, the experiments on machined bars show the mean ratio to be 1.153, while in the bars tested with the skin on the mean ratio is 1.146 times the breaking load, other conditions being equal.

Heating Alloys in Vacuo

Considerable attention has been devoted in recent years to the behavior of metals and alloys when heated in a vacuum, the object being to obtain a separation of the metal at a lower temperature than usual and to prevent loss by oxidation. In a paper before the fall meeting of the Institute of Metals at Portsmouth, England, in September, W. E. Thorneycroft and Prof. Thomas Turner gave interesting results of experiments to determine the effect of the percentage of copper on the rate of the removal of zinc from copper-zinc alloys when suitably heated in vacuo. Their conclusions were as follows: Alloys containing upward of 40 per cent. of copper can be separated quantitatively into their constituent metals, but when the copper content is less than 40 per cent. some of the copper is volatilized with the zinc. Copper-zinc alloys which contain a high percentage of zinc are slightly more volatile than pure zinc, and it is probable that one particular alloy will be found to have the lowest temperature of volatilization out of the whole series of alloys. Alloys containing a high percentage of copper require for complete separation of the zinc a degree of heat decidedly greater than that requisite for the volatilization of the separated zinc.

The Manufacturers' Association of Oregon held its annual meeting and banquet at the Commercial Club, Portland, Ore., on the evening of January 12. Reports presented show that manufacturing in Portland is on the increase. It was decided that the association would present a bill to the Legislature, giving the home manufacturer a preference of 5 per cent. on all State, county and municipal work.

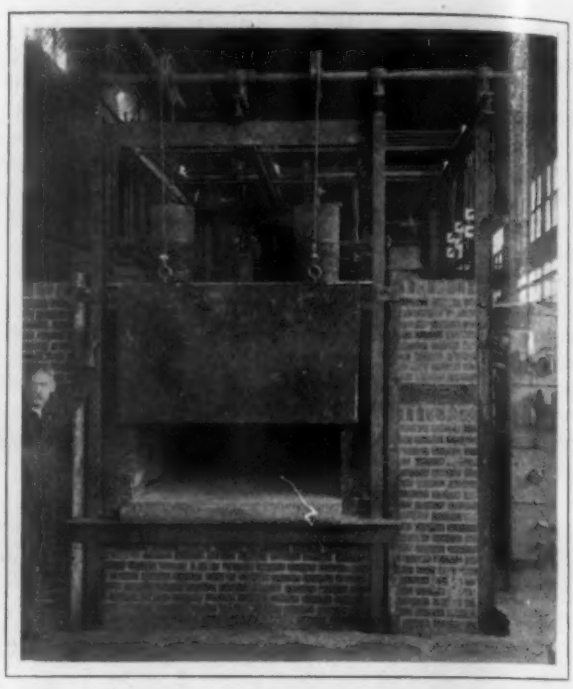
PAST YEAR IN ELECTRICITY

Some of the Notable Developments of the General Electric Company

In 1914 the General Electric Company, Schenectady, N. Y., built a number of larger sizes of generating and transformer units that had previously been in service. The year was also marked by advances in the development of electric furnaces of various types.

The Lehigh Coal & Navigation Company last November placed in service what is said to be the largest induction motor shaft hoist equipment in this country at Lansford, Pa. The driving motor, which is of the three-phase 25-cycle type, is rated at 750 hp at a speed of 300 r.p.m. and drives through a single reduction gear. One of the features is a liquid rheostat to give a positive control of the hoist, which serves a vertical shaft 600 ft. deep and hoists 11,500 lb. per trip, with a maximum rope speed of approximately 1600 ft. per min., 90 trips per hr. being made. Two sets of fixed electrodes at different elevations are employed in the rheostat, one being widely spaced, while the other has large areas and a small spacing to give a low final slip. Both sets are connected in parallel after the electrolyte has reached a certain level corresponding to a predetermined decrease in the rotor voltage from that of the supply line, 2300 volts. All parts of the rheostat itself are stationary and the level of the electrolyte is varied through the operation of a movable weir and a small motor-driven pump, this arrangement being relied upon to give great reliability.

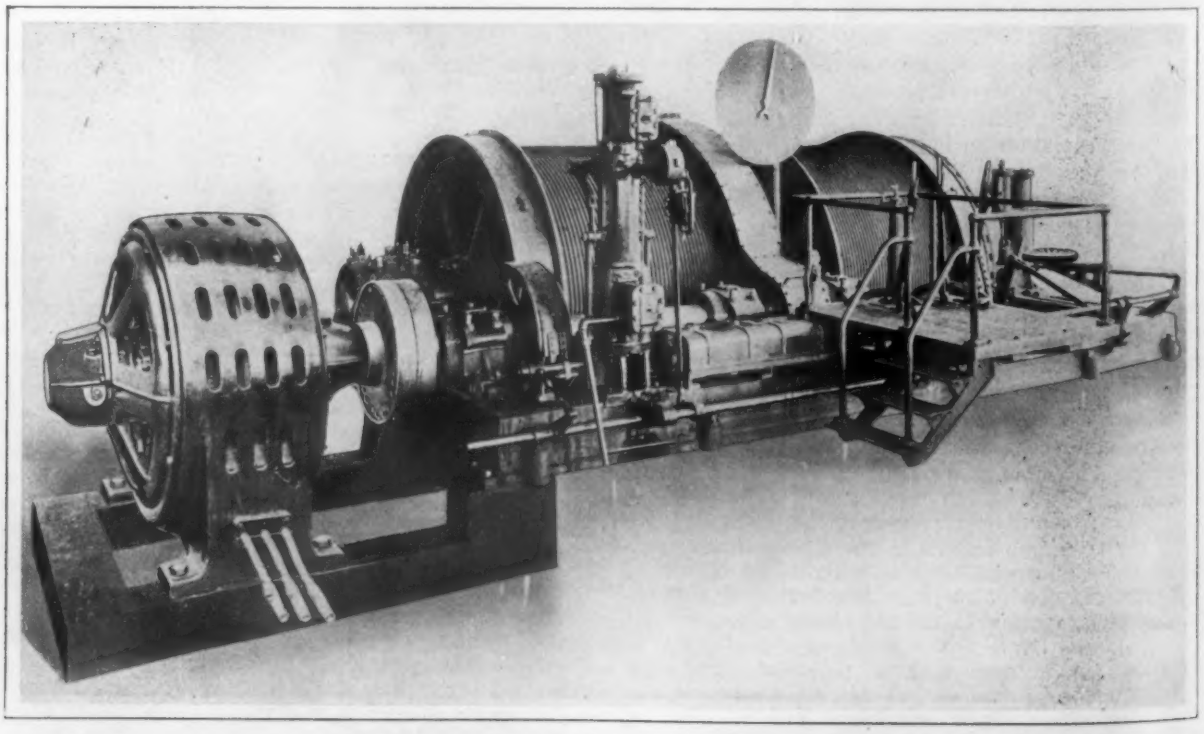
To provide a speed control for induction motors to meet the variable load requirements of rolling mills, a speed regulating set has been developed and installed at the plants of the American Iron & Steel Mfg. Company, Pennsylvania Steel Company, Forged Steel Wheel Company and Union Rolling Mill Company. These sets enable the induction motor to carry varying loads at a constant speed, thus giving it for all practical purposes the speed characteristic of the shunt wound direct-current motor, while at the same time the mechanical features of the induction motor are retained.



A 200-Ton Electric Annealing Furnace of the Resistance Type

In 1914 the size of commercial induction furnaces was increased from 2 to 20 tons. This furnace is of the two-ring type and utilizes single-phase 5-cycle current at 5000 volts. In connection with this furnace a special motor-generator set consisting of a two-pole, single-phase generator having an output of 4000 kva. at 5000 volts and a frequency of 5 cycles was developed, the generator being driven by a direct-connected three-phase 25-cycle 2300-volt synchronous motor. This furnace, which is the largest of any type in the United States used for refining steel, is of exceptional size, the core and coils weighing approximately 60 tons. In operation the furnace rings are charged with molten metal, every part of which is subjected to intense uniform and positively controlled heat and is then poured off after a treatment lasting from 60 to 90 min.

In connection with the arc type of furnace, spe-



The Largest Induction Motor Shaft Hoist Equipment in the United States Which Is Rated at 750 Hp. and Employs a Liquid Rheostat To Control the Hoisting Speed

cial forms of transformers and auxiliary equipment have been designed as well as an automatic control system by which the power output, aside from a short period after starting the furnace, is maintained at a constant value that is predetermined by the operator.

The resistance type of furnace, which utilizes the heat generated by passing the electric current through a resistor composed of foundry coke with auxiliary heating from a carborundum arch radiating heat downward on the charge, has also been provided with a simple current relay control, which is relied upon to insure the maintenance of a constant temperature over a range of approximately 600 to 1300 deg. C. for heat treatment operations.

Goggles for Gas Welding and Cutting

BY F. W. KING

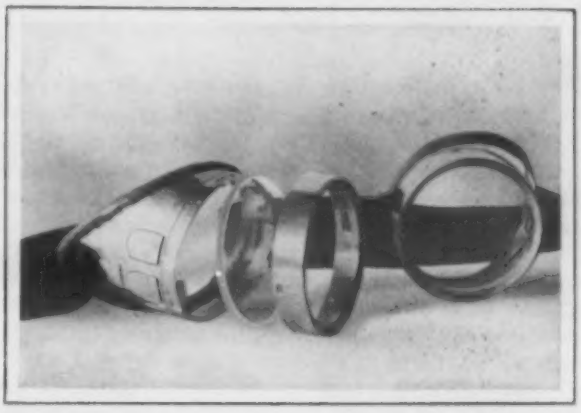
From the time the oxy-acetylene and the oxy-hydrogen welding processes were introduced, some eight years or so ago, it was found that a colored glass was necessary on account of the excessive glare produced in welding or cutting. Different colors of lenses were tried out and as a rule, some shade of greenish smoke or a smoked lens of some sort was chosen because it was apparently restful. They have been used ever since. By the same line of reasoning if one is ailing he could go into a drug store and by tasting different medicines finally select one with a pleasant taste and hand it down as a cure-all to future generations.

The ultra violet rays in welding are injurious, as they destroy animal tissue. They occur, in a dangerous volume, at a temperature of over 2000 deg. F. in molten iron or steel and greatly increase in proportion as the temperature is increased. At 6400 deg., encountered in electric carbon arc welding, they will probably cause permanent blindness within 3 min. if the eye is not protected.

The temperature of the metal in oxy-acetylene welding or cutting is about 4350 deg. F., and of the flame from 6800 to 7200 deg. F. It is therefore very obvious that great harm can result if a correct color screen is not used. The men will naturally prefer, at first, to wear the glasses they have been using and will claim they are all right as their eyes have not been causing them distress. When they do complain it will be too late. There are other conditions in the industries, where the temperature is not above 3000 deg., in which it has been shown that premature cataract has developed, after perhaps 15 or 20 years. As the eye will stand a great amount of abuse, the process has not been in use long enough for us to point to actual cases of blindness and this article is meant for those far enough advanced in safety welfare to see that their men have proper and scientific protection.

If all the ultra violet rays are eliminated, the remaining portion of the spectrum does not have to be anywhere nearly so much reduced as with the dark glasses men have been using, and as a consequence they can with correct lenses see to walk about and follow a chalk line in cutting that they were never able to do before.

There has been great difficulty in arriving at any sort of standard frame for mounting the lenses. The new model designed by the writer has aluminum construction throughout. The cups, containing the lenses, are of anatomical shape and conform so closely to the contour of the orbit that they will even keep out the fumes of acid. These cups have a cap that, by a very slight turn, comes off and allows a new lens to be inserted in a few seconds. They are correctly padded so the cups do not become hot even in the heaviest welding. One of the best features is the ventilating openings for which a patent has been applied. These may be opened or closed at will and are so placed that sparks or splashes of metal cannot possibly enter. The nose piece is adjustable for different pupillary distances. Head bands, with buckle, are the means of holding the new model in place and they may be renewed if they become worn. There are many purposes, besides welding and cutting, where this model, called the Dustsafe, may be used to great advantage.

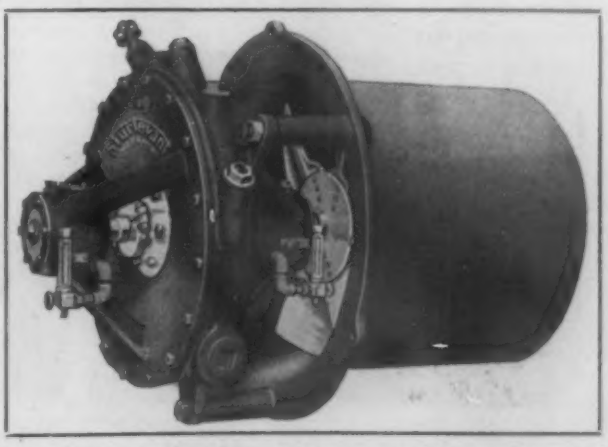


Goggles of Aluminum with Removable Lenses, Ventilating Openings in the Cups and Head Band for Support

The new color lens, known as the Saniweld, eliminates the ultra violet, the violet and the blue; it also reduces the infra red which, by its excessive energy, is the principal cause of eye fatigue. In tone the new glass is a sort of brownish orange and in its darker form enables one to look directly at the sun at midday without experiencing discomfort. As a rather interesting side feature it makes an ideal glass for baseball players in the sun field, as the fielder can take a fly ball directly out of the sun, and if it is then his turn to bat, he can see the first balls that come over the plate.

Turbo-Undergrate Mechanical Draft Blower

For use in plants where the chimney draft is insufficient, the B. F. Sturtevant Company, Hyde Park, Boston, Mass., has developed a small blower that is driven by a steam turbine. It is set in the brickwork of the boiler to increase boiler capacity by causing higher combustion rates and to burn cheaper grades of coal. From one to six nozzles of the steam turbine can be used, according to the requirements. Four sizes of blower are built, with fans ranging from 14 to 26 in. in diameter.



A Recently Developed Turbine-Driven Undergrate Blower for Supplying Induced Draft for Boilers

AUTOGENOUS PIPE WELDING

New Field Service for Making Repairs and Fittings Without Screwed or Flanged Parts

A recent extension of the sphere of usefulness in which the cutting and welding torch has shown marked economies in time and money has to do with the fitting of steel and wrought pipe and the laying of pipe mains. The process of building up unusual pipe sections difficult or impossible of making up advantageously in jointed lengths is not new so far as work in the shop is concerned, but recent accomplishments in the construction and repair of gas mains, on the job, by the use of the process of the Oxweld Acetylene Company, Chicago, Ill., appear to be innovations of decided importance. This work has included the welding of pipe joints and the building up from straight pipe of various sizes of elbows, T's, Y's and other standard and special fittings including reducers. The possibilities of time saving alone where on an isolated job ordinary pipe can be converted into the most unusual connection to meet emergency conditions as contrasted with the indefinite delay involved in securing a special cast fitting are obvious.

In welding gas mains, the pipes are strung alongside of the trench on the surface, ordinarily, although in the case of larger sizes, from 8 to 16 in. in diameter, the pipe is sometimes supported for welding on skids directly above the trench so that it may be the more conveniently lowered into place. The ends of the pipe to be joined in the weld may be cut off square or bevel, the latter being preferable and obtainable at the mill without extra cost. When the pipe ends are square they are not brought into actual contact but with beveled ends a closed V-shaped contact can be made. It is apparent that less filling material is necessary in the latter case to make the weld. This filler is a pure Norway iron wire which, with the ends of the pipe, is heated to a fusing temperature so that the joint is made with a true fusion weld that can be built up to any desired thickness in accordance with the strength required. Pipe of thinner metal section can be used with a welded joint for the reason that no threads have to be cut for screwed fittings. Continuous lengths of pipe up to 1000 ft. are made possible by welding and instances are cited where much greater lengths have been attained. At the Panama-Pacific Exposition grounds, as was illustrated in *The Iron Age*, November 5, 1914, some 1200 ft. of 4-in. pipe was welded into a continuous line. It has been found also that the weld joint pipe adapts itself more easily to the irregularities of the trench in which it is laid and diminishes in large measure the need of lining up the pipe to prevent leakage at the joints. It is stated that in common practice the cost of a welded joint is less by from 25 to 40 per cent. than the cost of screwed fittings.

The construction of fittings simply requires the cutting of a hole of the required size in the main with a cutting blowpipe and the welding into place of the diverging leg at whatever angle is desired. Some of the common fittings that have been built up in this manner are illustrated in an accompanying halftone. In the forming and welding the reducer shown, which has 4 and 6 in. sections, the flange is cut out of ½-in. plate and welded to a piece of 6-in. pipe. A similar piece of plate is cut out in such shape as to be rolled up into funnel form with one end 6 in. in diameter for welding to the 6-in. pipe and the other 4 in. for welding to the smaller pipe. It is estimated that the aggregate cost of labor, oxygen, acetylene and filling wire in making this reducer is about $3.35 and the time required about 1 hr. and 50 min.

Connecting a Drip into a Gas Main under Emergency Conditions by Cutting and Welding

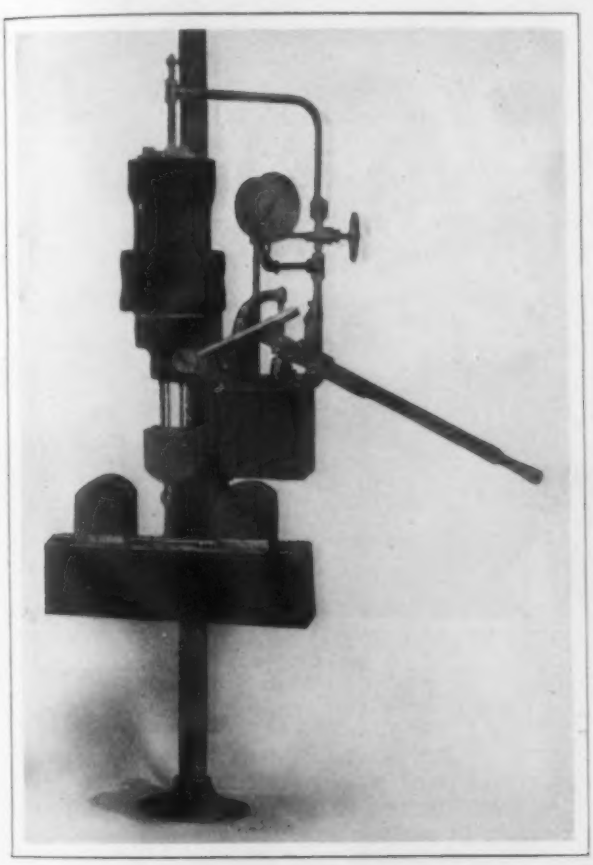
The application of the welding process under emergency conditions is also illustrated. This drip was furnished for in-

Some Typical Examples of Special Fittings Built Up by Cutting and Welding Sections of Straight Pipe

stallation in a 12-in. line with connections only 10 in. in diameter. The work was being done where it was necessary that the trench be kept open as short a time as possible. To avoid the delay of attempting to replace the drip with another of correct size the 10-in. connections were cut out and two lengths of 12-in. pipe welded in their place. In the same way breaks in pipe lines can be repaired without removing the pipe from the ground or breaking the main.

A New Hydraulic Pipe Bending Machine

For bending pipe of various sizes, the Hydraulic Press Mfg. Company, Mt. Gilead, Ohio, has placed a 30-ton hydraulic machine on the market. In addition to the work for which it was designed, pipe



An Improved 30-Ton Hydraulic Machine for Bending Pipe of Various Sizes and Similar Miscellaneous Work

bending, the machine can also be used for miscellaneous work, such as bending and straightening axles, small structural shapes, bars, shafts, etc., that comes up in machine, railroad and automobile shops. The special features of the machine are setting the cylinder so that it can be revolved and keyed in any desired position, thus bringing the operating handle in the most convenient position for the operator, and the method of adjusting the bending blocks by simply lifting them out of the notches and replacing them with new ones. The use of bending blocks enables pipe up to 4 in. in diameter to be bent.

The frame, which is in the form of a C, and the bending bed, are steel, cast in one piece, and the top of the former has a ring in which the cylinder sets. When the cylinder is placed in this ring and turned to the desired location, it is keyed in position. This arrangement, it is pointed out, is advantageous, since the cylinder can be placed in any desired position, and the handle of the rack and pinion is brought to the point that is most convenient for the operator. The bending blocks are mounted in a pressing bed which is 27 in. long with a pressing width of 8 in.

The ram, which has a diameter of 6 in. and a run of 9 in., is forced down by a hand-operated pump, having a plunger diameter of $\frac{5}{8}$ in. and a stroke of $3\frac{1}{2}$ in. The use of a hand-operated pump is relied upon to eliminate the danger of overbending the pipe or other material that is handled, and by the use of hand power, a rapid movement of the ram may be obtained at the start, when it is most desirable, and any desired speed of the ram can be developed when the bend is almost completed. A rack and pinion is provided for the rapid movement of the ram to the work before the pump is operated. The downward movement of the ram fills the cylinder with fluid, while motion in the opposite direction returns the fluid to the water box, thus, it is pointed out, eliminating lost motion. When the ram is returned to the top of the stroke, the distance between the top of the cylinder and the ram head is $24\frac{1}{2}$ in. and the daylight space between the ram head and the pressing bed is $14\frac{1}{4}$ in. The pump is equipped with a $\frac{1}{2}$-in. safety valve and a $\frac{1}{2}$-in. operating valve, controlled by a T-wheel. The reservoir is a part of the pump and a maximum pressure of 30 tons is developed. The over-all hight of the machine is 47 in.

Germany and Copper

"Metallurgy and the War" was the topic at a recent meeting of the Birmingham Metallurgic Society in Birmingham, England, December 17. Prof. T. Turner, the president, opened the discussion by saying that one of the highest tributes he could pay to the British navy was to quote the prices of metals in England of that week, which were approximately: Copper, £57 10s. ($279.82) per ton; tin, £148 ($720.25) per ton (both lower than prices obtaining two years ago); lead, £19 ($92.46) per ton; spelter, £27 ($131.39) per ton; Cleveland pig iron, 54s. ($13.14) per ton, and silver, 23d. (46c.) per ounce. Germany and Austria together, he stated, had an output of copper of about 52,000 tons per year, but the German consumption was 259,600 tons and that of Austria 37,200 tons per year, so that those two countries imported about five-sixths of their consumption. Their present production was a little over half the normal so that, assuming their use of copper to approach the former rate, it was reasonable to suppose that, if the war continued 12 months, a considerable shortage of copper would ensue in Germany, unless outside supplies were available.

Professor Ashley, dean of the faculty of commerce of Birmingham University, said that Germany was the second largest copper using country in the world and that about 14/15 of her consumption came from the United States. It was estimated that Germany had a stock of about 8,000 tons of copper at the war's outbreak, but it was very probable that shipbuilding and armament plants had large private stocks. It was his opinion that the termination of the war would be hastened by Germany's difficulty in obtaining supplies of copper and certain other materials.

As to spelter, F. Johnson, head of the Metallurgical Department of the Birmingham Municipal Technical School, said that to deal in England with the concentrates from the Broken Hill deposits on such a scale as on the continent, would require outlay for a special plant. He believed that Germany, Belgium and Holland melted annually before the war about 500,000 tons and that to treat that amount successfully would require a capital of £5,000,000 to £6,000,000.

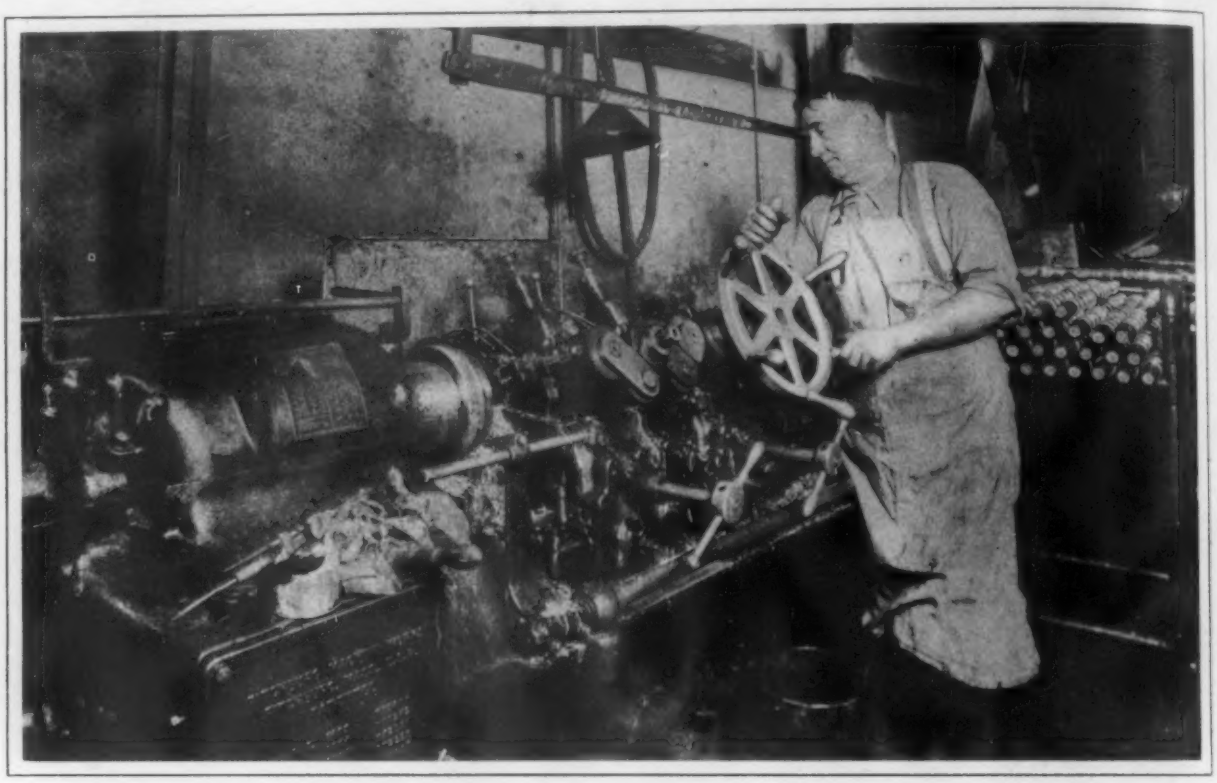
The Read-McGill Company, dealer in heavy hardware, iron, steel, blacksmiths' supplies, etc., 829 East Market street, Louisville, Ky., has filed a voluntary petition in bankruptcy, showing liabilities of $11,858.56 and assets of $10,189.

INCREASING PRODUCTION

How Meeting the Fatigue Factor at Studebaker Works Increased Production

BY HAROLD E. BARR

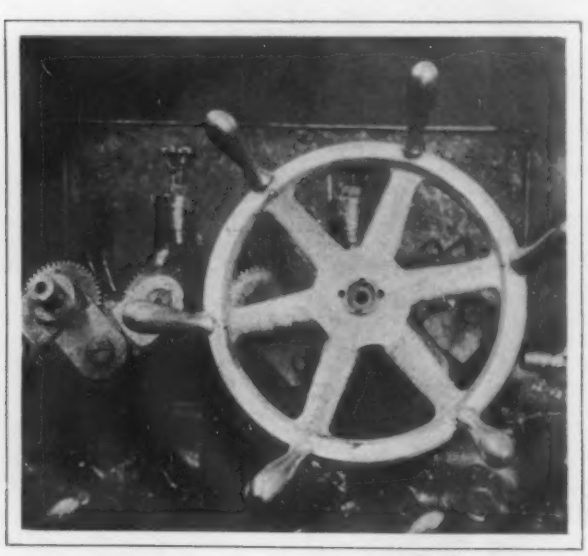
The accompanying photographs illustrate in part one of the ways in which the production department of the Studebaker Corporation, Detroit, takes advantage of every opportunity possible to increase production. The machine shown is a low-swing lathe manufactured by the Fitchburg Machine Works, Fitchburg, Mass., and is used for turning cam shafts. These cam shafts have 13 cams, and the machine shown is used for cutting down the size of the cams, or what is commonly called "necking them in." This is done with two sets of tools, one set consisting of seven tools and the other consisting of six tools.



Use of Handwheel in Turning Cam Shafts on a Lathe

The tools are fed into the work by means of a screw and handwheel, as shown. The operator is in the act of feeding one set of tools into the work, and it was found in watching this job particularly closely that the rate of production during the last three hours of the day fell off perceptibly. Investigation indicated that the workman became unnecessarily tired by lifting the handwheel shown from one set of tools to the other. In the operation the handwheel is shifted for every cam shaft turned once from one feed shaft to the other.

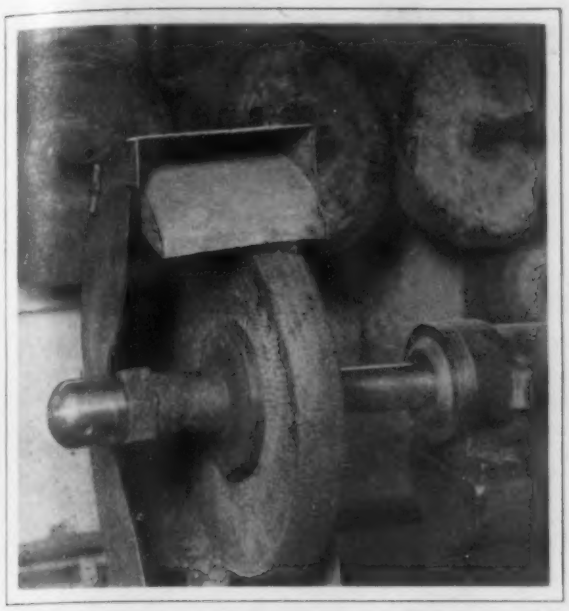
The style of handwheel previously used had merely a round rim, and the workman's hands becoming covered with oil made them very slippery and necessitated considerable strength to grip the wheel tight enough to feed the tools as fast as was necessary to get any production worth while. The handwheel originally used was made of cast iron, and without the handles or projecting spokes.



Near View of Handwheel for Feeding a Group of Tools

The first experiment was to change the handwheel to one of aluminum without any handles on it, and it was found that by decreasing the weight of the wheel the 2 lb. possible, the workman increased his product from about 80 to 83 pieces a day to 96 pieces per day. Afterwards were inserted in the rim of this wheel the handles shown, which enabled the workman to obtain a better grip on the work, and by doing this production increased from 96 to 110 or 113 pieces per day. Therefore, by substituting an aluminum wheel with handles for cast-iron wheels without anything on the round rim, production was increased from 80 to 83 pieces to 110 to 113 pieces per day.

Another interesting feature is the pneumatic chuck shown at the head end of the machine. Previously a dog was used as is commonly used in lathe work, and the dog changed from one shaft to another. By equipping this machine with the pneumatic chuck, thus saving the time necessary to place the piece in the machine, production was increased from 113 pieces to 196 pieces per day. One photograph shows the detail of the wheel and also the feed screw to the left, to which it has to be shifted once for every cam shaft turned. This experience



Protecting Thimble Over Threaded End of Buffing-Wheel Spindle

is a remarkable instance of what can be gained by attention to little details in the way of manufacture.

The third photograph shows a little safety first idea which has been applied to protect the end of the shaft shown. The smooth end is screwed upon the spindle, to prevent the workman's clothing from becoming caught with a thread on the end of the screw, which is used for screwing the flange up against the buffing wheel and holding it in position. This is a very simple method for protecting workmen from accidents, in cases where the end of a shaft is exposed and has a thread or anything likely to endanger the workman.

Improved High-Speed Stranding Machine

The New England Butt Company, Providence, R. I., has brought out a new line of stranding machines capable of running at higher speeds than have previously been the practice in the company's product. In the illustration is shown a seven-reel machine of this type, taking spools of wire from 7 to 9 in. in diameter and running continuously at a speed of 800 r.p.m.

The spools of wire are carried in cradles supported at the axis of the frame which revolves about them. The main bearing of the revolving head is of the ball-bearing type, and is contained in an oil-tight case in which also are the gears for driving the take-up shaft. The head is supported through its entire length by adjustable rollers mounted on cast-iron girts. The main drive is from tight and loose pulleys placed on the spindle of the revolving head. A belt shifter extends the entire length of the machine, within convenient reach of the operator, and is arranged to apply a powerful brake by the same movement which shifts the belt to the loose pulley.

The reel cradles are of an improved type and have standard ball bearings at each end. The bearings are readily adjusted and are arranged so that the cradles can be removed easily. This machine, though of heavy construction throughout, is light running.

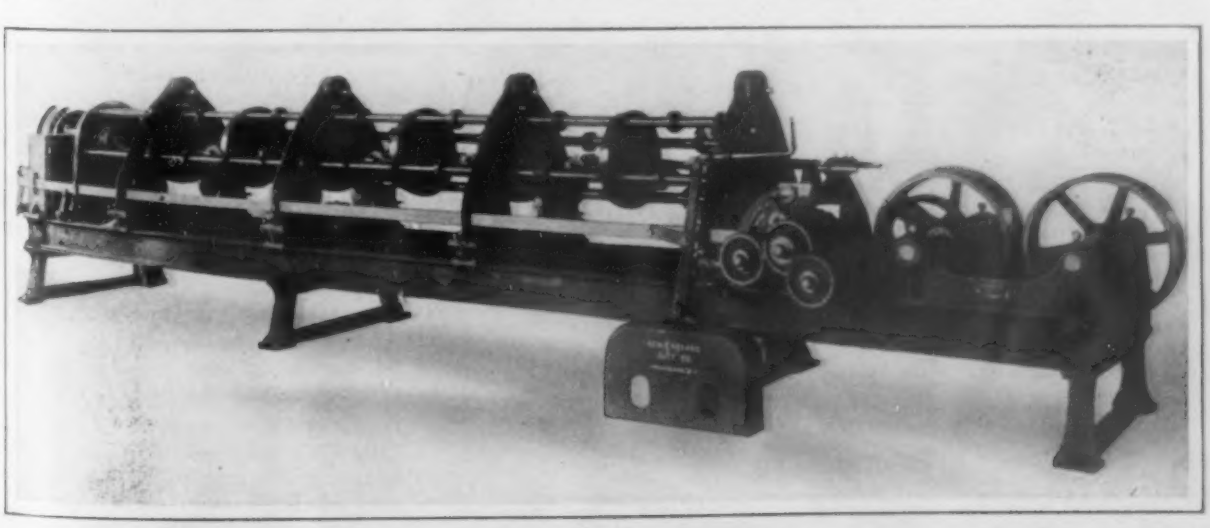
Battery and Trolley Mine Locomotive

For use in gathering and hauling cars in mines, the General Electric Company, Schenectady, N. Y., has developed a combination storage battery and trolley type of locomotive. It is equipped with a small self-contained motor-generator set for charging the battery automatically while the locomotive is running on the trolley. While gathering cars in the different rooms of the mine a varying percentage of the battery charge will be consumed, but these losses are automatically compensated for as soon as the locomotive is again operated on the trolley. The battery need never be entirely discharged with this dual system of operation, and an advantage of this arrangement is that if the space is limited, a smaller battery than would otherwise be necessary can be used. A representative machine of this type has been in operation in a West Virginia mine for some four months. It runs on a track having a gauge of 42 in. and its over-all hight does not exceed 30 in.

For use at the mines of the Braden Copper Company, in Chile, the company has constructed what is probably the heaviest and narrowest gauge locomotive, coupled with the lowest over-all hight of any machine of this type ever built. It is a 25-ton, double-truck machine designed for 30-in. gauge, and has an over-all hight of but 7½ ft. Four 45-hp. 250-volt motors, equipped with multiple unit control, furnish the power for propulsion, and automatic air brakes are also included in the equipment.

The practice of this company in the construction of mine and industrial locomotives is to build the truck frame of steel throughout, the sides and ends both being cut from single pieces of solid slab. Steel channels and plates are used for the platforms. All the details have as far as possible been developed along the lines of standard railroad practice.

The article in *The Iron Age* of January 28 on "Electric and Combustion Furnaces Compared" should have been credited to Bulletin 77 of the Bureau of Mines on "The Electric Furnace in Metallurgical Work."



An Improved Type of High-Speed Stranding Machine

The Use and Abuse of Time Studies

Need for Practical Men to Make Observations and Fix Rates of Pay—Use of Freehand Sketches of Suggested Tool Layouts

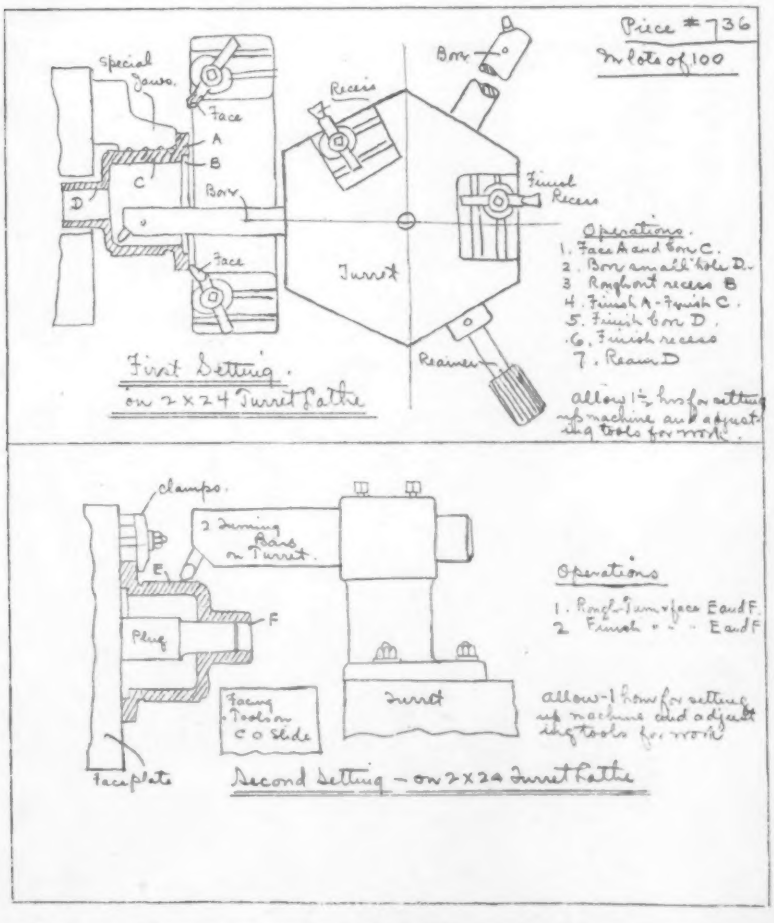
BY ALBERT A. DOWD

In connection with the handling of work on horizontal and vertical turret lathes and vertical boring mills, time studies in detail, of the necessary machining operations on the various pieces which are to be machined, are of the greatest value in assisting to set piecework prices. Reference layouts showing methods of tooling can be made to accompany the time-study sheets, and will be found valuable in eliminating wasted time when setting up the machines.

Whether the work passes through the factory in lots of 5000 or whether it is made up in smaller lots of say 50 to 100 pieces, the value of time studies carefully made more than pays for the expense and time incurred in their preparation. I am particularly referring to preliminary studies made before the work is in process in the factory, rather than those made in the shop under working conditions. It is an unfortunate fact that the majority of workmen and operatives in the shop are somewhat prejudiced against time studies,

Table 1.—Time Study for Machining an Aluminum Clutch Casing

Set'g	Operation		Cuts: Surfaces	Cuts: Diam.	Cuts: Length	Speeds: Ft. P.M.	Speeds: R.P.M.	Feeds: Per	Feeds: Rev.	Time in Minutes: Tur.	Time in Minutes: Cut-O.	Time in Minutes: Total
1st	1	Face	A	8½	1½	200	100		⅛	..	½	
		Bore	C	5½	4½	200	100–130		⅛	1½	..	1½
	2	Bore	D	3½	3½	190	260		⅛	½	..	½
	3	Recess	B	6½	½	200	120		Hand	½	..	½
	4	Finish	A	8½	1½	200	100		⅛	..	½	
		Bore	C	5½	4½	200	100–130		⅛	½	..	½
	5	Bore	D	3½	3½	250	320		⅛	½	..	½
	6	Recess	B	6½	½	200	120		Hand	½	..	½
	7	Ream	D	3½	3½	100	120		Hand	½	..	½
									Tot	al		3½
			Allow	for inde	xing an	d settin	g turret	over.				½
			Allow	for setti	ng and	removin	g work.				..	1
						Total t	ime, 1st	settin	g.			5
2nd	1	Turn	E	6½	3	200	120		⅛	½	..	½
		Face	F	4½	½		120		⅛	..	½	½
	2	Finish	E	6½	3	200	120		⅛	½	..	½
		Face	F	4½	½		120		⅛	..	½	½
										Tot	al	1
			Al	low for	indexin	g turret						½
			Al	low for	setting	and rem	oving w	ork.				1½
						Tot	al time,	2nd se	tting.			2½
			Total	time for	both se	ttings, 7	½ minut	es.				
			Total	for 100	pieces =	100x7½ / 60	= 12½ h	rs.				
			Allow	for setti	ng up m	achine,	1st setti	ng, 1½	hrs.			
			Allow	for setti	ng up m	achine,	second s	etting,	1 hr.			
			Allow	for grin	ding too	ls, both	settings	, 1 hr.				
				Total	for 100	pieces,	16 hour	s.				
			16x60 / 100	= 96 / 10	= 9.6 min.	safe tim	e for on	e piece	when	produc	ed in l	ots of
						100 piec	es.					
									Piece	No. 73	6.	



Sketch of a Suggested Tool Layout for Machining an Aluminum Clutch Casing. This Is a Reproduced Freehand Sketch That Is Blueprinted and Given to the Machinist

for the reason that they think the intention is to make them work harder. As a matter of fact the object is to make the machine do the work, economizing on time and labor by the use of brains and forethought, and saving lost time by careful study of working conditions, thereby making it really easier for the operator instead of harder, yet producing work of a better quality in a shorter space of time.

Undoubtedly the feeling against men who set the piecework prices in a factory and who also make time studies under working conditions, has been caused, in many cases, by the fact that the men responsible are not thoroughly practical men, and therefore do not take into consideration some of the points in machining which do not appear on the surface. For example: the time study man observes an operator engaged in drilling some small brackets in a jig, and counts the number of pieces which he produces in, say 15 min., taking note at the same time whether the man is working steadily or whether he is losing considerable time by talking to his neighbor. With this observation as a basis he sets the piecework price, in many cases making no allowance for manufacturing contingencies such as the grinding of tools several times a day, cleaning out the jig or fixture occasionally,

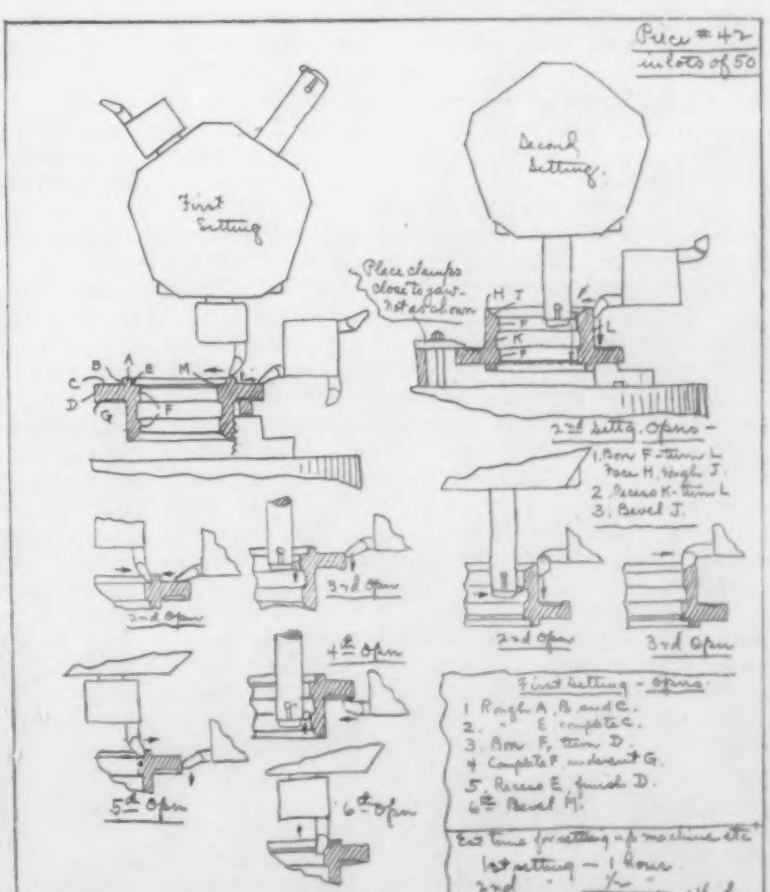
filing off a projection on a casting which interferes with its proper location, and the time necessary to set up the machine for the work. As a result the operator finds it impossible to obtain the production necessary to entitle him to a bonus on his day's work no matter how hard he may try. When he finds out that he cannot make anything extra he loses the incentive to rush the work along and, as a consequence, takes it rather easy to the great detriment of the ultimate production.

Table 2.—Time Study for Machining a Heavy Packing Gland

Set'g		Operation	Cuts: Surfaces	Cuts: Diam.	Cuts: Length	Speeds: Ft. P.M.	Speeds: R.P.M.	Feeds: Per	Feeds: Rev.	Time in Minutes: M. HD.	Time in Minutes: S. HD.	Time in Minutes: Total
1st	1	Rough	A-B	9¼	1		12		⅛	1¼		
		Face	C	14½	1½	50	12		⅛		1¼	
	2	Rough	E	8½	½		12		⅛	½		3½
		Complete	C	14½	1½	50	12		⅛		1¼	
	3	Bore	F	7	1½		12		⅛	2		2
		Turn	D	14½	1½	50	12		⅛		2	
	4	Complete	F	7	1½	25-50	12-24		⅛	1½		1½
		Undercut	G	14½	½	50	12		⅛		½	
	5	Finish	E	8½	½	25	12		Hand	½		1
		Finish	D	14½	1½	50	12		⅛		1	
	6	Bevel	M	7½	½	50	24		Hand	½		½
							Tota	l for fir	st setti	ng.		8 m.
					Allo	w for in	dexing	and sett	ing.			1
					Allo	w for se	tting an	d remov	ing wo	rk.		2
					To	tal for 1	st settin	g.				11 m.
2nd	1	Bore	F	7	3		18		⅛	2½		
		Rough	L-H-J	9 av.	5	45	18	⅛ an	d Han	d	4	4
	2	Recess	K	7½	1		18		Hand	1½		
		Finish	L	9½	3½	45	18		⅛		1½	1½
	3	Bevel	J	8½	½		18		Hand		½	½
							Second	setting	total.			6 m.
					Al	low for i	ndexing	and set	ting			½
					Al	low for	setting	and rem	oving	work		2½
					To	tal for s	econd s	etting				9 m.
				Tot	al for bo	th setti	ngs, 20	min.				
			To	tal for 5	0 piece	= 59x20 / 60	= 1000 / 60	= 16⅔ h	rs.			
			A	llow for	setting	up mac	hine, 1s	t settin	g, 1	hour		
			A	llow for	setting	up mac	hine 2n	d settin	g, ½	hour		
			A	llow for	grindin	g tools,	both set	tings,	1½	hours		
				Total ti	me for 5	0 pieces	,		19½	hours	say 20	hrs.
				20x60 / 50	=24 mi	n. each,	safe tim	e for on	e piece	when	produc	ed in lots of
							50 piece	s.			Piece	No. 42

Some years ago the writer saw an example of this kind of time study work in a Massachusetts factory devoted to the manufacture of automobiles. Two time-study and piecework experts, so-called, engaged at a high salary, made an attempt to increase production and decrease costs by observation time studies and an increase of feeds and speeds. The men were young and ingenious but were not thoroughly practical, and while they were able to make slight improvements by means of their observations in the line of time studies, their attempts to set feeds and speeds were disastrous because of their lack of practical knowledge along these lines. They antagonized both foremen of the various departments and the operatives by their conceit and their unwillingness to receive suggestions, no matter how reasonable or practical they might be. They were insistent that the feeds and speeds which they determined upon should be kept irrespective of the quality of the material which was to be machined. One instance is sufficient to show their attitude: A number of cast-iron brackets were being drilled in a jig and the diameter of the drill to be used was 53/64 in., the speed for which was set by the experts as 240 r.p.m. which amounted to a cutting speed of a trifle over 50 ft. per min. High-speed drills had been ordered for this particular piece but the order had been delayed because this size was not carried in stock and had to be made up special. Carbon drills were therefore used and the speed reduced to 160 r.p.m. equivalent to a cutting speed of about 35 ft. The foreman of the department stated the case to one of the experts and asked him to change the piecework prices accordingly. This he refused to do, stating that if he did this the other drills would be substituted when they arrived and that consequently the operator could increase his speeds and would make too much money. The drills did not materialize until too late to be of service, and the entire lot was machined with carbon drills. Both the operator and the foreman were so disgusted with the expert's attitude that no great effort was made to get the work out rapidly, so that the production cost was very nearly double what it should have been.

Time studies which help an operator to do his work with fewer movements and less exertion are of undoubted value in reducing the cost of production, but the men who undertake this class of work must be thoroughly practical in every way; men who can step right in and do the work themselves if necessary to show the workman. Many factories have obtained excellent results and have effected substantial savings by the employment of experienced men on this class of work.


Piece #42
in lots of 50
First Setting
Second Setting
Place clamps close to gear - not at chain
2nd Setting. Opns -
1. Bore F - turn L
Face H, Rough J.
2. Recess K - turn L
3. Bevel J.
2nd Opn
3rd Opn
4th Opn
5th Opn
6th Opn
First Setting - Opns
1. Rough A, B and C.
2. " E complete C.
3. Bore F, turn D.
4. Complete F, undercut G.
5. Recess E, finish D.
6th Bevel M.
Est time for setting up machine etc
1st setting - 1 hour
2nd " - ½ "
Total - 1½ hrs

Reproduced from a Freehand Sketch Showing the Sequence of Operations in Machining a Heavy Packing Gland. For Convenience the Various Surfaces Are Indicated by Letters

The value of preliminary time studies and sketches of tooling methods for the horizontal and vertical types of turret lathes is seldom appreciated by factory managers and superintendents, as it is usually left to the foreman of the departments handling work on these machines, to plan out his own methods of setting up and tooling. The foremen, in some cases, give the operator an idea of the method of handling desired. In the majority of instances, however, a great deal of latitude is given the operator and he selects his tools and makes his set up to suit himself. If he is ingenious and has had a good deal of experience, he gets the work out in very good time, although he almost invariably spends two or three times as much time on his set up as he would do if it were all planned out for him in advance. In many cases he does not take advantage of the possibilities of multi-cutting and therefore loses considerably in his production. This is especially noticeable when the work is put through the factory in comparatively small lots, and the amount of time spent in setting up the machine being chargeable against a small number of pieces increases the cost of production very materially.

When work of this character is handled on a piecework basis the men who set the prices usually look up the cost of producing some other piece of similar kind and use this as a basis in determining a price for the work to be machined. Yet the other piece may have been produced with special equipment or it may have been done by an operator of more than usual ability who perhaps is not in the company's employ at present. On the other hand the piece of work used as a reference may have been machined with ordinary tooling or under adverse conditions, such as an unskilled operator, or a lot of castings of more than usual hardness.

It is evident that under such conditions as these there is little chance of the piecework prices being such that the work will be produced to good advantage, for in the first case the operator sees that he cannot make any extra money and therefore does not hurry himself, while in the second instance he receives perhaps twice as much as the work is worth. In either case it is the company which is the loser.

Let us first consider the application of time studies to a class of work passing through the factory in lots of 100 pieces, say two or three times a year. A condition of this kind does not usually warrant the expenditure of much money for special tools unless the work is such that a great loss of time would result if an attempt were made to machine it with regular equipment. The man who makes the time studies must be absolutely familiar with the machine on which the work is to be done and he must also have a wide knowledge of available tool equipment. In addition to this he must have feeds and speeds at his finger ends and must know in a general way the character of the castings or forgings to be machined.

A time study for a piece of average work with a roughly outlined freehand sketch of the tool layout, is of the greatest advantage both to an operator in setting up his machine and also to the man who is called upon to set the piecework prices, and the results obtained by a system of this kind are satisfactory both to the factory manager and to the operator, for the reason that in the one case the work is put through in good time and in the other the operator has no grounds for complaint because if he can't get out the work in the time allowed with the tooling indicated, and the speeds and feeds suggested, he has good reasons for claiming that the piecework prices are too low.

One of the accompanying drawings shows a freehand sketch suggestion for a tool layout to machine the aluminum clutch casing, a sectional view of which is illustrated. This layout was made in pencil on a piece of thin tracing paper, and an outline of turret and cross slide traced through from a small scale layout slipped under the tracing paper to obtain approximate proportions. The time necessary to sketch out a layout of this kind is about ½ hr., for a man experienced on work of this nature. The surfaces to be machined are all lettered and a list of operations forms a part of the drawing, so that the operator who receives a blueprint of this sketch, has everything all planned out for him. All he has to do is to select the tools noted on the drawing and set them up in the sequence shown. The upper part of the illustration shows the first setting and the lower portion gives the method of handling in the second setting. The machine which seems most suited to the work is also specified together with the time allowed for setting up the work and adjusting the tools to their correct positions so that everything is ready.

In addition to the blueprint layout of tools, the department where the work is to be done receives a copy of the time study shown in Table 1. A reference to this will show that feeds and speeds are given for all the surfaces to be machined, these being specified according to the letters on the layout. Allowance is made for indexing and setting the turret over for boring and also for the various movements necessary and the time for setting up and removing the work from the chuck is specified. Time for grinding and resetting tools is also incorporated in the time study, and an average found from the various items, on which the piecework price can be based with a reasonable amount of certainty that it is fair to the operator and that it also gives the manufacturer all he can expect without going to the expense of special tooling. If the operator finds that he cannot make the time specified because the castings are bad or for some other reason, he has the time study and layout to fall back on so that he really can have no good reason for complaint. In planning out work in this manner occasional errors are made; for instance, when a piece has been specified to be machined with a cutting speed of 50 ft. per min., it may be found that the castings are so extremely hard that this is not permissible and that 35 ft. is all they will stand. Or it may be found that due to the method of holding, a coarse feed cannot be used without pulling the work out of the jaws. In any event the manufacturer is always assured that he will get all the production possible or know the reason why, and it will be found that in the majority of cases, the work will be produced in less time than the time study calls for.

In laying out tools for vertical turret lathe work a little more detail is usually desirable than on the horizontal type of machine because of the side head turret tools in addition to those in the main head. Also, to obtain the greatest possible production it is necessary to have both heads working simultaneously as far as possible, and to keep the cutting tools at work on diameters as near the same size as can be arranged. That is to say, it is not profitable to have a tool in the main head working on a small diameter while the side head tool is turning or facing one of large size, because the cutting speed of the main head tool would then be far below its effective working capacity and there would be a consequent loss in production. There are, of course, instances where an arrangement of this sort is necessary to keep both heads in operation, but in

the majority of cases the tools can be arranged so that they are working close together. A machine of the vertical type with turret side head, is adaptable for a great variety of work without anything very special in the line of tooling, but the tool layouts must receive considerable care in order to obtain the maximum production, for the reasons just stated.

The work shown in section in the second drawing is a heavy packing gland which is put through the factory in lots of 50 pieces at a time. No special tooling whatever is necessary to produce this piece, although a forged tool for the beveled portion must be ground to suit the angle. It will be noted that although this layout is made freehand like the other, the various operations are suggested in both settings and the direction of the cuts is indicated by the arrows. This shows the operator at a glance just which tools are to be used for each surface to be machined, and therefore makes the matter of setting up the machine a great deal simpler. It also shows just which tools are used simultaneously and makes the entire sequence of operations perfectly clear. As in the preceding instance, the list of operations is given on this sheet together with the estimated time for setting up the machine for both settings. Attention is called to the fact that the layout is so made as to keep both heads working almost continuously and that furthermore they are utilized in such a way as to permit them to be at work on diameters as nearly the same size as is practical.

Table 2 gives the time study of the piece in detail for both settings, specifying the various cuts by reference letters and giving feeds and speeds for all the work. In addition to this the sheet contains the time allowance made for grinding and resetting tools, indexing, and setting up and removing the piece from the machine.

In this case the work is passing through the factory in lots of 50 pieces at a time so that the time study is based on this figure instead of 100 as in the former instance.

A trial of the methods given here for work on turret lathes of either the horizontal or vertical types, will be found to result in a higher production, a consequent reduction in piecework prices and a more satisfied group of operators on the various machines. The same idea can be applied to some other classes of work but its utility is perhaps of greater value along the lines shown than when applied to other varieties of machine work.

A current report that Takata & Co., 50 Church street, New York, are taking bids on a large quantity of rolling-mill equipment for the Imperial Steel Works of Japan is without foundation. They had been commissioned to draw up preliminary specifications for a plate mill, which were to have been used as the basis for a bill at the last Imperial Diet. Inasmuch as the diet was recently peremptorily dissolved by the Mikado, the bill asking for the appropriation is now put over probably for more than a year, and nothing indicates that any arbitrary edict will revive the project before that time.

Heat-Treated Low-Carbon Axle Steel

The beneficial effects of the heat treatment of low carbon axle steels are not so widely known as they ought to be, according to E. A. Suverkrop in the American Machinist for January 14, 1915. The table below gives the results of tests of coupons taken from three steel railroad axles, both before and after treatment. The axles had been in service for some time, and were not specially selected. Random selection was made from a stock of similar ones.

Table of Tests and Treatment of Low-Carbon Axle Steel

		Heat treatment, deg. F.					Physical properties					Endurance test	
No.	Carbon content	Annealed	Quenching temperature	Quenched in	Drawing temperature	Drawing furnace	Elastic limit, lb.	Ultimate strength, lb.	Elongation in 2 in. per cent.	Reduction in area, per cent.	Bend test, deg.	Stress, lb. per sq. in.	Life, No. of stresses
1	0.50	No	No	No	No	No	29,030	69,010	29.1	35.8	180	30,000	79,440
2	0.50	No	1500	Water	1100	Gas	50,140	80,817	30.7	57.0	Flat	30,000	169,900
3	0.41	No	No	No	No	No	31,505	73,627	31.8	43.5	180	30,000	57,550
4	0.41	No	1500	Water	1000	Gas	54,575	90,250	25.4	52.4	Flat	30,000	177,900
5	0.50	No	No	No	No	No	34,370	83,430	22.6	30.0	96	30,000	182,000
6	0.50	No	1500	Water	1200	Gas	53,655	90,092	27.1	52.8	Flat	30,000	186,300

The effect of the heat treatment is especially noticeable in the elevation of the elastic ratio from 41 to 42 per cent. in the untreated to 60 to 62 per cent. in the treated, which change is reflected in the difference in the endurance tests. In each steel also the tensile strength is raised by about 16 and 17 per cent. in the first two and 8½ per cent. in the last set by the treatment.

A Two-Part Rifling Machine for Guns

A 50,000-lb. machine for rifling guns up to the maximum bore of 8 in. and any desired length up to 30 ft. is being built by the Detrick & Harvey Machine Company, Baltimore, Md. It is built in two sections, a bed with two removable steady rests for supporting the gun and a runway on legs which carries the traveling carriages and bearings for supporting the rifling bar. The bar is held longitudinally in the carriage bearing, but is free to turn in it. A spiral groove of the same pitch as the rifling in the gun is provided in the bar, and an index head at the opposite end of the runway has a pin which engages in the master groove of the bar, thus enabling the bar to be set for any given number of grooves. In this way, rotary motion in combination with the longitudinal movement derived from the traveling carriage is imparted and a twisting tension is kept on the bar by counterweight mechanism on the carriage.

An intermediate bearing furnishes an extra support for the bar and is geared so as to travel at exactly half the speed of the carriage. In this way it always remains equally distant from the carriage and index head and reaches the end of the runway simultaneously with the former. This bearing and the carriage derive their motion from a screw 4¾ in. in diameter which receives power through a shifting belt drive or a direct-connected 10-hp. reversing motor, such as is used for driving planing machines.

"Ironized" Steel Tubes

"Ironized" steel tubes, non-corrosive, will soon be on the market, according to the London Electrician of November 20, 1914. The British Mannesmann Tube Company has just completed a plant for ferro-zincing and ironizing tubes under license from Sherard Cowper-Coles. The process electrolytically coats the steel surface with almost pure iron, the only impurity of any consequence being hydrogen, which is claimed an advantage in that it renders the iron slightly more electropositive to the underlying steel than it would otherwise be. The coating is said also to be unusually homogeneous and not under unequal strain, nor subjected to any heat or mechanical treatment. It is also of advantage to coat the electrolytic iron surface with zinc.

At present more than 400 national and international congresses and conventions have chosen San Francisco as the 1915 meeting place, including 25 educational conventions.

Protection of Parts in Case Hardening

A French Discussion of the Various Methods —Copper the Most Efficient—Electric Deposition and Schoop Process Compared

The protection of local parts against case hardening is a problem to which a great deal of attention has been paid and it is one of considerable importance. A valuable paper on this subject, well illustrated by photomicrographs, has been contributed to La Revue de Metallurgie by Dr. Leon Guillet and Victor Bernard, the former of whom is an authority on all case-hardening matters. The special object of the experiments described was to test the protective power of metals sprayed on the pieces to be case hardened by the Schoop process, which has been described in *The Iron Age*.

THREE METHODS USED AT PRESENT

The methods in present use are first described and illustrated. The first consists in covering the parts to be protected with fire clay or a similar material, to which method there are numerous objections. The protection afforded is never absolute, and the material does not adhere of itself to the pieces but has to be supported in place by metallic devices, more or less complicated and formed by sheet iron, wires and screws. Illustrations are given showing how delicate and elaborate some of these arrangements are. The hand work necessary seriously increases the cost of the case-hardening operations, as does also the very rapid deterioration of these accessories, the use of the refractory materials employed, and the extra fuel needed to heat all this inert material.

The second method consists of shrinking a thin piece of steel on the part to be protected, and is only capable of application to simple cases, such as a simple shaft where a band or tube may be shrunk on hot. The thickness of this tube should be slightly superior to that of the case desired, so that the part covered may be properly protected. The quenching which follows case hardening makes this tube, which has been made high in carbon, very brittle so that it can be readily broken away by a few light blows of a hammer.

The third method is subsequent removal of the case-hardened part, and is used particularly for very delicate pieces. It consists in leaving excess metal at the parts that are to be soft after the operation, the extra thickness being equal to or slightly superior to that of the case desired. Before quenching, this extra metal must be machined away, and the result is all that could be wished. This method is necessarily costly, and is therefore not greatly employed.

RESULTS OBTAINED BY METALLIC DEPOSITS

In order that a metallic coating may serve as a protection it must meet the following requirements:

1. Remain solid at the temperature of the operation, otherwise it will melt, flow away, and leave the surfaces unprotected.
2. Be impermeable to the substances which, under the operating conditions, produce the case hardening.
3. Be easy to produce industrially, and, it may be added, be capable of easy removal after case hardening and quenching, which is often necessary.

These conditions practically limit the field to copper and nickel, and the latter is practically excluded on account of its cost. The application of these two metals was studied and to a slight extent that of tin, notwithstanding its low melting point, because of the ease with which coatings can be obtained by the use of the so-called "liquid tin."

The processes used to obtain the copper coating were immersion in a solution of a copper salt or painting with such a solution, electroplating, and the Schoop process. The first method was very seductive at the first glance because of its simplicity. It was not found, however, to be of practical value, because, even under the best conditions, the copper deposit was too thin to adequately protect the metal if the case-hardening operation was at all prolonged. The coating was also found to be irregular, being united and adherent in some places, and loose and pulverulent at others, without the factors governing this condition being discoverable. Research was abandoned along this line.

In regard to the coating produced by electroplating, experiments were made to determine the minimum thickness necessary to afford absolute protection. The same idea was followed with coatings produced by the spray process, so as to enable exact comparisons to be made regarding the protection afforded by deposits of equal thickness produced by the two processes. In reality such comparison could not be made because the Schoop deposit compared to an electrolytic one is granular and irregular, and therefore does not allow of sufficiently exact measurement. It may be added that such a comparison is not of great interest because of the rapidity with which an absolutely protective covering can be produced by the Schoop process. In the experiments with nickel, electroplating only was used, for reasons that will be brought out later.

PROTECTION BY ELECTROPLATED COPPER COATING

Bars of very soft steel were used for the experiments, 10 mm in diameter and 100 mm long. The coating was applied only to a portion of their length, so that the remainder served to indicate the extent of the case hardening. The thickness of the coating was carefully measured to the hundredth of a millimeter. A bath of cyanide was used for plating, and for carbonizing the mixture of 60 parts by weight of wood charcoal and 40 parts barium carbonate. The results are shown in the following table from which it is seen that the thickness of the deposit necessary is a function of the temperature and time of case hardening:

Temperature of case-hardening, deg. C	Thickness of carbon in non-protected parts in mm	Thickness of copper coating in mm	Amount of protection
1,000	1.0 to 1.1	0.01 to 0.02	Light carbonizing
1,000	1.0 to 1.1	0.02 to 0.03	Absolute
1,000	1.8 to 2.0	0.01 to 0.02	Considerable case hardening
1,000	1.8 to 2.0	0.03 to 0.04	Absolute
850	1.0 to 1.1	0.01 to 0.02	Absolute

The tests with coatings produced by the Schoop process have shown, as mentioned above, that several minutes' spraying is sufficient to obtain a deposit more than thick enough to absolutely protect the metal against case hardening. When this was fully determined no further tests were made.

PROTECTION AFFORDED BY NICKEL

The method adopted for testing the nickel coat-

ings was exactly the same as that used for copper. A bath of nickel-ammonium sulphate was used as the electrolyte. Contrary to the results found with copper, nickel cannot be successfully used as a protective agent. It only retards cementation to a small degree which shows that it is permeable by carbon monoxide. With a coating 0.14 to 0.18 mm and a temperature of 1000 deg. C., the depth of case produced was about 1 mm compared to 1.4 mm in the parts not protected. If the thickness of deposit is considerably increased then sufficient protection can undoubtedly be obtained for less important work, but when it is mentioned that a deposit analagous to those tried requires several hours to produce, then it is seen that the use of this metal cannot be carried out practically.

Some experiments were made with tin, which can be applied very easily, but it should only be used on plane surfaces that can be laid horizontal, otherwise the protection afforded is little or none, for the tin melts and runs away, and may accumulate on surfaces that should be carbonized. The possibilities of its use are therefore very limited, and microscopic examination also shows that the steel in contact with the tin is strongly affected. The conclusion is therefore that copper alone solves the question of local protection against case hardening.

ELECTRIC DEPOSITION AND SCHOOP COMPARED

The question then is which of the two methods of producing the coating should be used, electroplating or the Schoop spray process? The latter appears the better because of the simplicity of its practical operation, the rapidity with which the coating is produced, and the ease with which any particular part can be coated. At the same time it must be pointed out that, if the case-hardening plant alone has to carry the considerable cost of installation and depreciation (license, compressors and accessories, sand-blast plant, etc.), then it is a serious matter. If, however, it is part of a large plant that can use the Schoop process in other ways, the possibility of application is considerably widened.

The electroplating method has for advantages the low cost of installation which makes it available for almost any plant, the automatic character of the operation, and the small consumption of copper, for all that is required is the minimum thickness to give protection. On the other hand it is inferior to the Schoop process in localizing the deposit. In the latter process very simple methods can be used, for instance paper bands serve to protect the steel sufficiently well in most cases. It is very difficult, however, to properly protect surfaces against electroplating, especially with alkaline electrolytes. These difficulties are gone into in some detail in the original paper. They constitute an important advantage for the Schoop process, and together with the others pointed out above determined the Dion-Bouton works in Paris to install for trial a Schoop apparatus, which is now actually at work. The choice between the two methods naturally depends, to a large extent, on local conditions.

G. B. W.

Notwithstanding the fact that the main plant and carpenter shop of the Columbia Fire Brick Company, Strasburg, Ohio, were destroyed by fire in the second week in January, the company is making daily shipments of brick from stock. For the past four or five months, when trade was depressed, the company kept its plant running to full capacity and thus was enabled to have a heavy stock from which it is now filling all old and new orders. It is energetically making preparations for rebuilding the plant and expects to have it in operation by March 15.

German Iron and Metal Trades

Labor scarcity in the mining districts is seriously affecting iron ore supplies of the blast furnaces. The Siegerland Iron Ore Association is unable to meet the heavy demand from Rhineland and Westphalia. The Nassau mine owners and others are having trouble in securing trained miners. The Siegerland Iron Ore Association reports a production of 143,243 tons in October and 140,926 tons in November, the deliveries being 144,671 tons and 161,800 tons respectively.

The pig-iron market has improved, mainly because of military contracts. Forge iron at Siegen is quoted at $17.27 for the first quarter, steel-making iron at $18, No. 1 foundry iron at $19.34 and No. 3 foundry at $18.12. Pig iron from Lorraine-Luxemburg plants is $15.21 to $14.72 f o b. Luxemburg prices for ingots have advanced to $20.69 to $21.90.

Some plate mills are busy on military orders, others dull. Prices quoted are: Thick, $27.37 to $27.98; medium, $29.20; thin, $30.42 to $32.85 at works. Export prices for thick plates are $25.55 to $25.79; thin, $26.76. These export prices are not profitable even with the bounty, because of high cost of production due to decreased output. Wrought iron for horse shoes is very active and the Nassau and Sauerland works are very busy.

The lowest bids submitted to the Berlin section of the Prussian State Railways covering 1915 requirements for different sorts of bar iron and sheets show a general reduction from prices of a year ago.

Rivet makers are operating at about one-third normal capacity, the basis price being $36.50. This has been cut in some cases to $35.03.

The Screw Manufacturers' Association has reduced the prices of screws by an increased discount of 1 to 2 per cent.

The Upper Silesian market has improved, works operating at 40 to 60 per cent., with no price cutting in bar iron, steel plates and castings.

Since the dissolution of the wire rod syndicate early in November, basic rods have fallen to $25.06 to $25.55. Export conditions are more difficult. Suspecting that British firms are trying to secure wire rods and drawn wire through Scandinavian and other countries the German government will permit exports only when assurances are given that they are to be used by the country concerned. Wire nails are now down to $31.63.

Business of the Pig Iron Association for the present quarter is satisfactory, particularly in special brands. Deliveries in December did not reach the 55.7 per cent. record of November.

Demands of the military authorities constitute the only business in the Luxemburg iron market, but at unprofitable figures. Structural sections are in no demand, but bar iron is, and prices are firmer.

Maximum prices for manufactured metals have now been announced, following those for metals as reported in *The Iron Age* of January 7: Copper wire, $25.30 per cwt.; drawn wire, at least 1.44 mm. dia., $27.37; copper sheets, at least 1.44 mm. thick and up to 1 m. wide, $29.20; drawn copper tubes, $31.43; brass rods, $21.28; brass sheets, $23.11; brass tubes, $28.59; round aluminum rods, $45.01 and aluminum sheets, $46.83 to $48.66 per cwt. These prices became effective January 2.

Maximum prices have been fixed for nickel anodes, rods, bars, wire, sheets and tubes, at $116.79 per 100 kg.

The German Spelter Syndicate has decided to continue in its present form until March, 1916, except for changes in the constitution necessitated by the war. The international syndicate is dissolved. Demand for spelter has become more active and large orders have been distributed. A shortage in zinc ores is expected.

According to a cablegram published in New York February 2, an official order has been promulgated in Germany directing that all stocks of copper, tin, aluminum, nickel, antimony and lead be held for the use of the army. Only a short time ago announcement was made that the copper supply was ample.

Continuous Malleable Cupola Practice

Requirements for Success and Details of Cupola Design

The accompanying article is an important contribution to malleable foundry metallurgy

BY L. E. GILMORE,
Consulting Metallurgical Engineer, Pottstown, Pa., author of "Leaves from the Diary of a Malleable Man," in The Iron Age of January 7, 1915.

WHEN a malleable iron foundry, equipped wholly or in part with cupolas as melting furnaces, reaches a volume of production that requires the running of a cupola for a period of time much longer than two or two and one-half hours, it becomes necessary to slag the cupola and to adopt methods of continuous operation.

TWO IMPORTANT REQUIREMENTS

In melting cupola malleable iron the metallurgist has to meet two requirements of prime importance: First, the iron must be hot enough to fill all parts of the mold, and second, it must be of a chemical composition suitable for annealing. The sections of much of the iron cast in a cupola malleable foundry are so thin that only the hottest iron will run them. A practical foundry guide for proper temperature for casting such thin sections is that each ladle of iron, as it leaves the tapping spout, is clear hot and free from any floating islands of cooler iron. The proper chemical composition is that which, under normal conditions of casting and cooling, produces a white iron in which the elements are in such relative proportions that the carbon may be completely precipitated in the form of temper carbon during the annealing operation. Fortunately, the same conditions of melting produce iron both hot and of correct chemical composition, provided the mixture is properly made. Faulty methods of operation that cause dull iron will almost invariably upset even the best calculated mixture.

DESIGN OF THE CUPOLA

Bradley Stoughton, in his chapters on the cupola, in "The Metallurgy of Iron and Steel," deduces general directions for ratios between certain dimensions, such as the area of the cross-section of the cupola should be less than 6.56 times the tuyere area; the area of the tuyeres should not be less than ¼ the area of the cupola; the hight of the charging door above the tuyeres should be greater than 2½ times the diameter of the cupola.

Modern types of cupolas are pretty well standardized and are constructed with dimensions within the limits specified above. Pressure blowers are made in sizes to correspond with the cupolas and are designed to furnish at least 30,000 cu. ft. of air for each ton of iron to be melted. With a view to economy of power, the blast pipes leading from the blower to the cupola should be built of such size, and with as few and as gradual turns as possible in order to offer the minimum resistance to the passage of the air.

A horizontal section of the cupola shows that the lining usually consists of two rings of cupola blocks, although the outer ring may be of 9-in. straight fire brick. For repairs to offset the daily wearing action at the melting zone, and to keep the interior walls vertical, mica schist is of great service because of its refractory properties and ease of cleavage. The spout is lined with fire brick and clay. The sand bottom should slope slightly toward the tapping hole to facilitate draining the cupola.

When a cupola must be operated for more than two to two and one-half hours to increase the output, methods of continuous operation must be resorted to.

The hight of the slag hole above the bottom is of great importance in continuous operation of the cupola, as on this distance depends the amount of molten iron that is constantly standing in the hearth. Whatever the diameter of a cupola the volume of the hearth may well be such as to hold the amount of iron that is melted in approximately 10 minutes. If held on the hearth too long the iron cools.

SIZE AND KINDS OF TAP HOLES

It is very essential that the tap hole be of just such size that the iron is drawn from the cupola at the same rate as it melts. This assures keeping the molten iron level with the slag hole, after the hearth has once been filled, thus enabling the slag to flow continuously from the back of the cupola at the same time that the iron is running from the tap hole. To accomplish all this, a nice balance is required between the size of the tap hole and the regulation of the speed of melting. If a breast block is used, it should be so proportioned that the hole is a little smaller than will allow the iron to flow through as fast as it is melted. Then the hole can be reamed out to exact size. If using clay instead of fire brick for the breast, two or three tap holes can be prepared, and when one becomes too large through use, another may then be opened. As there is considerable pressure exerted by the iron, care must be taken to keep the holes well plugged when not in use. A properly burned brick has the advantage of holding the size of the tap hole fairly constant throughout the heat.

In case the tap hole is too large, the results may be disastrous. As the iron escapes faster than it melts, the cupola is soon drained and the slag drops below the slag hole and can no longer be drawn off. Then follows a series of cycles, stopping up until the iron is raised to the slag hole level, then tapping out, and draining the cupola. Thus the flow of slag is intermittent, and when it drops the air blast in the cupola cools the hole so that it is liable to become frozen. With this stopped up, the iron will probably be allowed to rise above the hole, carrying the slag with it. As the slag is thus constantly raised and lowered and is forming faster than it is drawn out, it begins to clog up the cupola. On account of this clogging the blast is localized and overoxidizes the silicon and manganese of the iron and dull melting follows. The same disastrous result is sure to follow the stopping up of the slag hole for any reason. If not closed too long, however, normal conditions of melting may be resumed after a time. The only safe course to pursue is to make conditions such that the level of the iron is kept at the slag hole, which should always be

Increasing Output of Malleable Castings

The Coke and the Metals and How to Use Them

Recommendations of the author as to the pressure blowers and blast pipes; the horizontal section of the cupola; the hight of the slag hole; the size and kinds of tap holes and the proper use of coke for continuous operation.

open. This hole may be formed in clay, although the fire brick made for that purpose may be more convenient.

USE OF COKE AND COAL

A good quality of coke makes the best fuel for the cupola. Coal should be used only in specially designed cupolas. The use of coal mixed in the bed or charges serves no purpose that cannot be as well attained by an equal or less weight of coke. For instance, less coke is required to raise the top of the bed to the melting zone, for the specific gravity of coal is greater than that of coke.

There are a number of good cokes on the market with ash 8 per cent. or less and sulphur under 0.85 per cent., and with a structure hard enough not to break too readily in handling nor to crush under the weight of the charges in the cupola. A fuel high in ash has the disadvantage of lower heating value as well as a greater unburnable residue. For this reason the cheapness of price may be more than discounted by extra weight required for hot melting and the additional amount of slag for which provision must be made.

Malleable cupola practice requires a larger amount of fuel per ton of iron melted than does gray iron. This is due to higher temperatures required to run thin sections and to lower percentages of phosphorus and silicon which make the "life" of the iron shorter. A ratio of coke to iron varying from 1 to 4 up to 1 to 5.5 is about the malleable range. The attempt to better 1 to 5.5 means a liability of dull iron. The longer the heat the better the ratio, as the extra coke of the bed is then divided by more and more charges. This improved fuel ratio is one of the economical advantages of "continuous operation."

DISTRIBUTION OF COKE CHARGES

The amount of coke in the bed and between iron charges must be so proportioned that the iron fuses high in the melting zone. This produces iron of the temperature required, but at the same time causes a somewhat slower rate of melting than would be the case with gray iron when using less fuel. If the bed has the proper depth the first iron will appear in about 12 to 15 minutes. By using a ratio of 1 to 6 between iron charges a good coke will melt very hot iron at a rate of 16 to 17 lb. per min. for each square foot of area of cross-section.

The speed of melting can be increased or diminished within limits by varying the blast pressure. However, any large increase in pressure must be accompanied by additional fuel for the bed, because the melting zone is forced higher in the cupola by each increment of pressure. A 6 to 12-oz. pressure should give good hot melting; 16 oz. or over show excessive clogging of the cupola by slag or too tightly packed materials such as finely divided coke or scrap iron. The fire should be started early enough so that the bed will burn through evenly before charging the first iron. About two hours will elapse between starting the fire and putting on the blast.

Some founders place a large first charge of iron on the bed, followed by smaller charges. Such practice is based on the false premise that the bed charge of coke is so large that it ought to melt more iron than the succeeding coke charges. As the function of the bed is to hold each charge of iron at the proper level in the melting zone during fusion, only so much coke should be burned from the top of the bed as will be replaced in turn by each descending charge of coke. Therefore, all charges of iron should be of equal size in order that the same amount of coke will be burned in melting them. Furthermore, to keep the fluctuations in the position of the melting zone within the limits of hot melting, the iron charges should be kept within an amount that will require not over 10 minutes for complete fusion. The top row of tuyeres found in a great many cupolas should be closed, because if used the position of the melting zone is raised, which makes necessary an additional amount of coke on the bed.

NATURE AND AMOUNT OF THE FLUX

As the continuous operation of the cupola depends so largely upon the success in removing slag, the amount and nature of the flux is of great importance. Since cupola operation is acid practice, the use of limestone, dolomite, or fluorspar will give about the same result. With limestone, the beneficial action is that the lime (CaO) unites with the silica, either sand from iron or ash from coke, to form calcium silicate. In a similar manner magnesium and calcium silicates are formed when using dolomite. Fluorspar (CaF_2) also has a certain advantage, in that it lowers the melting point of slag by forming a solution of fluoride in the silicates. The greater the amount of ash in the coke, and the more the sand or dirt charged with the iron, the larger is the amount of flux required. In other words, an increase in the acid element (SiO_2) requires an addition to the basic element (CaO) for neutralization. A weight of limestone, 20 to 25 per cent. of the coke used in each charge, will ordinarily make a good fluid slag.

The metals used in a malleable cupola mixture usually comprise white iron sprue(including scrap), annealed scrap, pig iron, steel, and spiegel or ferromanganese. Most foundries produce all the sprue and annealed scrap that they can readily make use of, so the materials to be purchased are pig, steel and some iron-manganese alloy. Foreign annealed scrap or wrought iron is sometimes used in place of steel. In foundries which operate several air furnaces or open hearths in addition to cupolas, the mixture may be made up entirely of sprues and

The author discusses the nature and amount of fluxes and the advantages of the use of steel in the mixtures with remarks on melting losses.

annealed scrap with suitable addition of manganese. The higher silicon of air-furnace or open-hearth iron may be sufficient to compensate for the silicon loss from melting in the cupola.

ADVANTAGES IN THE USE OF STEEL

When pig is a part of the charge it is usually advisable to use steel also, unless indeed the pig has a silicon percentage well down toward that of the sprue. The use of a mixture of steel and pig has two great advantages; first, the lower price of the steel as compared with pig reduces the cost of the mixture, and second, such a mixture furnishes greater flexibility for the proper balancing of the chemical composition.

The different materials of the charge should be introduced in the order of their difficulty in melting. First, spiegel or ferromanganese, followed by steel, then pig and finally sprue and scrap. It is wiser to avoid pieces of large size, and machine-cast pig will melt more readily and with less fuel expenditure than will sand-covered pig.

Under normal conditions the melting loss in silicon will average from 0.10 to 0.15 per cent. and that of manganese from 0.15 to 0.25 per cent. The molten iron as it drops through the coke and slag will pick up from 0.06 to 0.12 per cent. in sulphur, depending upon the purity of the coke and the management of the cupola. In continuous operation as the length of heat is prolonged, even under the best working conditions, a greater oxidization of silicon and manganese will progressively take place, due no doubt to gradual accumulations which the flux does not remove and which interfere with the normal action of the blast. So at intervals the mixture requires a slight increase in silicon and manganese.

BALANCING OF THE ELEMENTS

Soft black heart malleable will be produced by proper annealing of a cupola white iron in which the elements silicon, manganese and sulphur are properly proportioned. The balancing of these elements is a study in itself. Therefore this article cannot enter into a discussion of the principles underlying their interdependent relationship, but will simply state that no uniform success in producing good malleable iron can be maintained under varying conditions unless the influence of each element in its relative effect upon the others is known, and taken into account in mixtures and in furnace management. With such knowledge a black heart is attainable even with iron containing sulphur 0.40 per cent. or more.

FREQUENT TESTING ADVISABLE

A convenient and practical foundry guide for ascertaining whether the carbon of the white iron is properly combined is furnished by casting testers at frequent intervals during the heat. A round bar about 1 in. in diameter, if not gray but well mottled with spots of graphite, indicates that in the thin sections of the castings the carbon is all in the form of carbides. The white iron should be as near the "low" or gray side as possible and yet retain practically all the carbon in combination.

Test bars for annealing should also be cast at intervals during the heat. These may be of round or rectangular section. If not for use in tensile or transverse tests, the wedge-shaped bar is a good form, for it can be broken with a hammer to show varying thicknesses in section.

The West Penn Steel Company, Brackenridge, Pa., has opened a Detroit office in room 514 Dime Bank Building. George R. Fink is manager. The Eastern half of Michigan will be covered from this office.

Copper Production and Stock

The National Brass & Copper Tube Company, 41 Park Row, New York, publishes in its Copper Gossip, dated January 20, the following interesting statement regarding the present position of copper, which cannot fail to arrest attention, both from the prominence of the company in the copper trade and the absence of official copper producers' figures:

"From available statistics and estimates regarding the production of refined copper for the year 1914, from domestic sources and foreign metal received into this country for treatment, the total output is placed at 1,493,000,000 lb. This compares with 1,615,067,000 lb. in 1913. On January 1, 1914, the surplus stock of marketable copper in the United States amounted to 91,438,867 lb. The total available supplies of refined copper in this country in 1914 were therefore 1,584,438,867 lb. Deducting exports, December estimated, supplies left for domestic consumption were 794,289,747 lb., or at the rate of 66,190,812 lb. a month. Exports, partly estimated, were 790,149,120 lb.

"For the first six months of last year official statistics showed that 330,643,117 lb. of copper were delivered for domestic consumption, being at an average monthly rate of 55,107,186 lb. After the breaking out of the war in Europe in August, American consumptive demand fell off greatly, and for the last half of the year the quantity of copper consumed was much less than in the first half of 1914. We therefore estimate domestic consumption for the six months ended December 31, 1914, at 210,000,000 lb., or at an average rate of 35,000,000 lb. per month. On the basis of the foregoing calculation the total United States copper consumption for the calendar year 1914 would appear to have been 540,643,116 lb. Subtracting domestic consumption and exports from production and available supplies, the result shows stocks of refined copper on hand January 1, 1915, of 253,646,631 lb. If home consumption for the last half of 1914 should have possibly equaled an average of 40,000,000 lb. a month the stock carried over at the beginning of this year would appear as 223,646,631 lb.

"The dissolution of the Copper Producers' Association was announced January 13, and the trade will have to get along without the figures of refinery production, deliveries for domestic consumption, and stocks carried over on the first of each month. The monthly statements of copper statistics were looked upon as an established thing in copper circles, and the information furnished thereby was found to be more or less useful. It will remain to be seen how the new experiment will work. The new plan will furnish scope for guess work, and the element of mystery may operate as a factor in sizing up the copper situation henceforth."

The Relation of the Employer to Safety

In an address delivered at the recent safety exposition in Columbus, Charles R. Hook, general superintendent of the American Rolling Mill Company, Middletown, Ohio, said that in his opinion the duty of the employer was to support all general policies or legislation which have for their object the education of men, women and children in the details of the safety movement. The least important factor in accident prevention is mechanical safeguarding and the education of the workman in safety is by far the most important. No real progress in the safety movement can be made unless there is enlightened, constructive co-operation between the employer and employee. In his opinion, the present safety first campaigns were only the beginnings, and the inevitable tendency of the future is toward closer and closer relations between the corporate employer and employee, wherein the principle of their community of interests will be recognized and brought to its full development, there being a mutual recognition of the fact that the welfare of each is bound up with that of the other. As a result of the safety first organization in the plant of his own company, accidents decreased from 231 in August, 1914, to 79 in December, and the ratio of accidents to the number of men employed fell off from 14 to 6 per cent.

SEGREGATION IN STEEL RAILS

New Specifications and the Success of Titanium in Meeting Them

Recent changes in rail specifications, particularly with regard to the permissible variation of carbon caused by segregation, were alluded to in *The Iron Age* of January 21. In an article by F. A. J. Fitzgerald, of the Fitzgerald Laboratories, Inc., Niagara Falls, N. Y., in the December issue of Metallurgical and Chemical Engineering entitled "Has Titanium Any Influence on the Properties of Steel?" this point is discussed. Extracts from the article are as follows:

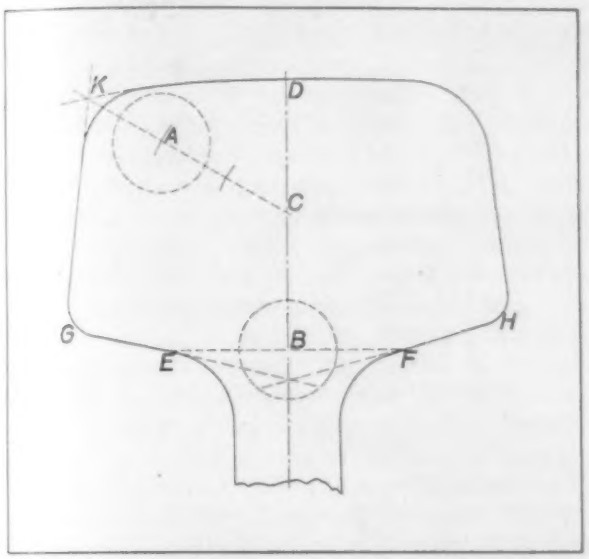


Fig. 1—Rail Section Showing Location of Places for Drilling Samples

The Titanium Alloy Mfg. Company recently allowed the writer to examine a number of records covering tests, which on analysis seem to show beyond a doubt that the addition of titanium to steel has an important influence on its properties.

DATA FROM 155 HEATS

The data are derived from very complete reports on 155 heats, representing the production of over 9000 tons of 100-lb. steel rails, all made at the same mill and under as uniform conditions as could be expected. In 78 heats no addition of titanium was made, while in 77 heats ferrotitanium was added in the ladle. Here, then, there appears to be a sufficient number of observations on a large enough scale to eliminate to a great extent the effect of variable errors.

It seems to be believed by a great many authorities that segregation is one of the chief causes of trouble, and with this in view a method of detecting segregation has been proposed for use in the specifications for rails. Referring to Fig. 1, which represents a section of a rail, drillings are taken at places indicated by the circles A and B. The centers of B and A are found respectively as follows:

The points E and F are where the lines G E and H F leave the edge of the section. The line E F is drawn and bisected at B, which is the center of the circle.

The line B D is drawn along the axis of symmetry of the section and bisected at C. The point K is the intersection of the prolongation of the curve D K with the line G K. Join C and K and then the center A is found at two-thirds of the distance of C from the intersection of C K and the edge of the section. The samples for analysis are made with a 5/8-in. drill and used for carbon determinations.

WHAT THE SPECIFICATIONS DEMAND

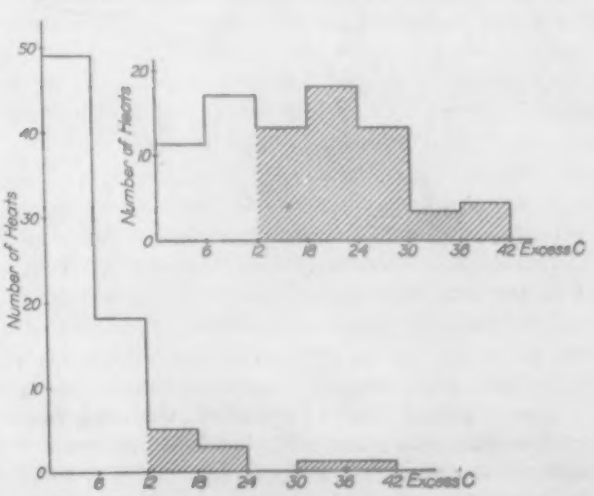
In the proposed specifications these samples are taken from A rails, i. e., the first rails made from the heads of the ingots after a 9 per cent. crop. In general the carbon in the sample at B is found to be higher than that in sample A and it is suggested that whenever the carbon in B is more than 12 per cent. greater than that in A the rail should be rejected. In the 155 heats under consideration this method of testing was used, since it was maintained that the use of titanium diminished segregation. Accordingly from every heat the Titanium Alloy Mfg. Company took the nineteenth ingot for applying the test and the steel company took the eighteenth for a check test.

There are various ways in which the results obtained may be shown, but they are best illustrated by the diagrams of Fig. 2. In order to make the diagrams the various heats were divided up into seven groups as follows:

Group No.	Per cent. excess of carbon in web
1	6.0 or less
2	6.1 to 12.0
3	12.1 to 18.0
4	18.1 to 24.0
5	24.1 to 30.0
6	30.1 to 36.0
7	36.1 to 42.0

The number of heats falling in each group was then determined and from these the diagrams were drawn. The upper diagram shows the results obtained in the 78 heats where no titanium was used and the lower diagram the result from the 77 heats where titanium was used. In each case the shaded portion shows the heats where the carbon is in excess of the limit set by the proposed specification.

The test shows that where no titanium was used only 36 per cent. of the heats gave A rails which came within the proposed specification limits, while with the use of titanium 87 per cent. would pass.



Figs. 2 (Upper) and 3—Diagrams of Results Obtained with Heats of Steel Without and With the Use of Ferrotitanium

A more detailed examination of the 77 heats in which titanium was used clearly shows the influence the amount of titanium added has on the results. According to the advice of the Titanium Alloy Mfg. Company the amount of ferro-carbon-titanium used should be such that the quantity of metallic titanium added to the steel is 0.10 per cent. This, however, was not followed as in some heats only 0.075 per cent. was added and in some as little as 0.053 per cent. Best results required at least 0.10 per cent.

ESTABLISHED 1855

THE IRON AGE

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Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.* Charles G. Phillips, *Vice-Pres.* Fritz J. Frank, *Secretary* M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: New England Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, $5.00 per year; to Canada, $7.50 per year; to other foreign countries, $10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

The Literacy Test

In a game of chess a single player with ability of a certain standard can frequently defeat a group of players of equal ability, acting in consultation, because the single player must trust entirely to himself and therefore thinks harder, though no better able to think than any one in the group of opponents. It is partly on account of this principle that the veto power upon legislation is a wise provision. President Wilson's veto of the immigration bill, chiefly on account of the literacy test, is one that finds favor in many quarters. If the United States had what business men so often say it should have, but do not exert themselves to see that it secures, a business Congress, the judgment of the President might not be as good as the collective judgment of the members of Congress. They would hail from all sections of the country and be close to the people, familiar with the views of the people, and under no need of reaching conclusions upon theory, while the Chief Executive, necessarily more removed from intimate contact with the people, would be moved more by theoretical considerations.

In the case of the immigration bill, however, there is presented a case of the president being the practical factor and the members of Congress those who depend upon theory for their views. If the Congress had been composed of business men there is little likelihood that the immigration bill would have carried the literacy test. Business men know, first, that the "Americans" do not want jobs such as can be filled by immigrants unable to read and, second, that there is a great deal of work waiting to be done by such unlettered immigrants.

We do not pretend to maintain that the immigration laws should be based simply upon conditions that obtain in or pertain to the steel industry, but when the industry is such an important one, being frequently spoken of as "the basic industry," it cannot be denied that it should be possible to derive from the experience of those connected with it much information that should prove of value in molding immigration laws.

Now the steel industry presents the clearest possible case of a large supply of unlettered immigrant labor being a direct force for the making of jobs for American born and educated workmen. The major portion of the men employed in the iron and steel industry perform work that is entirely agreeable to them, being precisely the work they hoped to secure when they came to the country, and it is work in which the average American will not engage unless offered a very substantial premium. It is idle to assert that these men do not know in advance the character of the work. They not only know in the first place, but many of them migrate back and forth in harmony with the ups and downs in iron and steel making activity. Managers of coke works assert that there is something almost uncanny in the way the men pack up and leave the country when a depression in the trade is coming on, and how they begin to reappear as prospects of employment brighten. Perhaps these men cannot read the market reports in *The Iron Age*, but they have a line upon the market that is fairly adequate for their purpose.

To restrict immigration very materially would be, undoubtedly, to raise the standard of wages for common labor in the iron and steel industry, but the employment bureaus of steel works will testify that there is hardly a conceivable advance in wage rates that would bring to them the typical "American workman" in whose interest the literacy test of the immigration bill was presumably framed. Supposing, however, such a thing were done, the result would be to increase very greatly the cost of making steel. That increased cost would be paid by the buyer, of course, and the tendency would be to restrict the consumption. Scarcely any steel is made by the steel mills that passes directly into consumption; as a rule there is much fabrication, which is generally done by these typical "American workmen," and in that work there is no competition by the illiterate foreigner. In other words, he finds his place at the coke works, at the blast furnace and in the steel mill yard, not in the machine shop, the automobile factory, the agricultural implement works or the boiler shop. To prevent him from coming to this country to take the one job which no one else wants is to reduce the number of jobs for intelligent American workmen, jobs that they do want.

The shortsightedness of Congress in this matter is due largely to its members taking the extremely superficial view that there is nothing in the labor situation but unlimited competition of every workman in the United States with every other workman, whereas the competition is chiefly between the members of individual groups. The groups compete with each other very rarely. The molder or machinist does not seek a job at the blast furnace when work in his trade is slack, and given a chance to render an intelligent opinion he would doubtless ask that blast furnace labor be cheapened as much

as possible so that it would be easier for the foundry and machine shop to secure orders, either domestic or export. From such details the average Congressman keeps entirely aloof.

The Engineering Foundation

In the account elsewhere in this issue of the establishment of the Engineering Foundation through a gift of $200,000 from Ambrose Swasey, some space is given to the address by Dr. Henry S. Pritchett. It is one answer to the question, What concrete results will grow out of the Foundation? To say that the fund is to be "devoted to the advancement of the engineering arts and sciences in all their branches, to the greatest good of the engineering profession and to the benefit of mankind," is to speak in very broad terms. The donor has apparently not surrounded the gift with any restrictions. In fact, it is somewhat disappointing that Mr. Swasey in his informal remarks at the inauguration ceremony did not refer to any general, let alone specific, lines for the Foundation to follow. Instead he maintained the self-effacing attitude of being simply the founder.

Using Dr. Pritchett's address by way of suggestion, we find one definite possible development. The intimation is that an institution may be built up to which engineers, engaged say in manufacturing, may bring their problems to ascertain whether solutions of a similar problem have been made elsewhere or may indeed be worked out by the Foundation. It is recognized, of course, that the Bureau of Standards at Washington is regularly publishing the results of investigations of great importance commercially and that similarly valuable work is being done by the Bureau of Mines, to mention another Governmental activity, and by the engineering experiment stations of some of our universities. Undoubtedly there are lines of work which may be better taken up by the Engineering Foundation without duplication of effort. Accordingly the programme of the Engineering Foundation Board will be awaited with great interest.

Meanwhile the Foundation may help to bring about a closer union of the large engineering societies. The four largest now join in selecting the recipient of the John Fritz medal, but the Foundation may be counted on to weld them still more closely until it will be easier to cultivate the sentiment undoubtedly growing that there should be one national engineering society.

Bonus Rates on Similar Parts

The unbreakable rule of the successful premium or bonus system of wages must be an unbreakable rate. The basis in time or money upon which the additional compensation of the workman is fixed must always remain unchanged, except if it should prove unfair to the employee, or, the reduction being against him, if it has his full co-operation. Of course, improved methods and equipment supplied to him cause corrections.

One detail of operation of the system is sometimes overlooked. Where pieces are much alike, though perhaps intended for dissimilar purposes, care should be taken that the rate on the one conforms fairly with that on the other. For illustration, in a certain factory a lot of gear blanks was machined last spring at a certain base rate. A lot of similar blanks, but of different size and character, is given out today. The task is essentially the same. The time required for manufacturing is very little different. The rate should be correspondingly similar. Yet as the jobs do not come together in the records, and one is new, the rate setter may establish a radically lower basis. The former rate may have been too high, but it was set as unbreakable, under the same conditions of equipment. Therefore it is considered wise under such circumstances to conform to what has already been established as a precedent.

Workmen operating under bonus keep account of the work they have done. The more orderly maintain complete, businesslike records, with the numbers of the part and the lot, its character, machine used, etc. They are quick to realize, and not a few of them are quick to suspect, that the principle that a rate once set shall always remain the rate has not been lived up to. Where a system is well organized, the intentional change would not be possible, unless the workmen were told all about it in advance. But it may happen accidentally. In a machine shop, as new tools are brought out the similarity of parts to those of previous machines of other types is not always recognized. The rate maker's blunder should be quickly corrected.

Machine Tools for South America

American manufacturers of machine tools have been giving close study to the possibilities of trade with South America, which in their calculations includes Central America and the West Indies, and have come to a pretty definite conclusion as to what these countries will require in the next few years. In the first place the amount of high class machinery which will be purchased will be small. There is practically no manufacturing as we understand the term; nothing is fabricated from metal excepting as parts are machined for use as repairs. These southern countries have their mines and plantations and ranches; their railroads, steam and electric, their electric lighting and refrigerating plants and other enterprises which come under the head of public utilities. In the larger centers, especially on the coast, are general repair shops which care for the needs of the shipping as well as for those of general industry. There are a few government shops. But in nearly every case it is a repair proposition.

The mines as a rule are isolated and must attend to their own repairs. They carry duplicate parts for their equipment, purchased from the builders in the United States and Europe. But they must also have machine shops. The same is true of many of the plantations, where coffee, sugar, cacao and other staples are prepared for the market. Machine tools are required, but any experienced machinery builder will understand the class of tools which usually are purchased. The total trade is not insignificant, but it is not large. And the equipment is not selected with great care. Probably ordinarily good second-hand machinery would find as ready a market as the new. The

average shop is said to be something after the order of those which are found too often in American textile mills and in the repair departments of many of the railroads here. But it should not be lost sight of that much of the machinery in these South American countries was purchased from Europe, especially from Germany. It can be furnished by the United States.

Considering this market for machinery in its broader sense, the real opportunity is for mining and plantation machinery; equipment employed in developing new properties; railroad equipment and supplies; electrical apparatus, mill supplies and the like, down through a list that could be extended at length. But for machine tools the demand is restricted within narrow lines.

Wage Reductions

When the United States Steel Corporation announced in December that it contemplated no general reduction in wages, the presumption was immediately drawn that no wage reductions whatever would be made in the steel trade. The corporation was looked upon as the leader in establishing a wage policy for all steel manufacturers. Some criticism was heard regarding its attitude, especially by manufacturers who had no large surplus to carry them through a lean time, as they felt that their workmen should bear some portion of the current sacrifice of earnings. Nevertheless, the announcement by the corporation was accepted by the public as indicating a belief that the worst part of the depression had passed and that improved conditions were to be expected. The attitude of the corporation on this important matter had much to do with injecting a more hopeful, if not confident, feeling throughout business circles.

Events of the past two weeks, however, have shown that trade conditions, in at least some branches of the steel industry, are such that employers are being obliged to act independently in taking steps to reduce their cost of production. The sheet manufacturers have lowered the wages of their best paid workmen, the cut in some mills having been as high as 15 per cent. This is a drastic reduction and forcibly demonstrates the serious conditions with which the manufacturers of sheets have lately been struggling. Competition in this branch has increased heavily in the past few years and the productive capacity of the sheet mills is now far beyond the requirements of the country. Even the depression of the past year has not stopped the erection of new plants and the addition of more mills to old plants, with the inevitable result of bringing prices down to a ruinous level. It is interesting in this connection to note that Chairman E. H. Gary of the United States Steel Corporation denies that any of its subsidiaries has reduced wages or contemplates so doing. This disposes of the report that the American Sheet & Tin Plate Company had reduced sheet-mill workers' wages, thus forcing the independents to take the same course. Now that the movement toward lower wage scales has started, it will be interesting to see whether it will extend to other branches of the steel industry. Some of them need the reduction in cost thus made as much as the sheet manufacturers.

CORRESPONDENCE

Modified Bonus Method of Wage Payment

To the Editor: Kindly allow me space to make a correction of the report in your issue of December 17 of my "Modified Bonus Method of Wage Payment." The diagram which you printed correctly represents the bonus method which I propose to modify but it is not Gantt's method. The Gantt method you correctly describe in the text but it does not fit the diagram. for a time taken on a completed job *less than* the time allowed or task time, payment is made not for the task time plus the bonus time (Gantt's method) but for the time taken or elapsed time plus the bonus time. The curve of Gantt's bonuses would be represented by a horizontal line extending from D to the vertical axis. To revise your numerical statement on page 1385 referring to the diagram as it stands: "Thus if a workman completes his 4-hr. task in 3.6 hr. (saving 10 per cent. of the task time) his wages will be the sum" of 90 cents for the time taken plus a bonus of 35 cents plus an additional bonus of 5 cents (this last equals half the wage value of the saving of time, not one-third), or a total of $1.30 instead of $1.35 for that performance under Gantt's bonus or $1.25 under the method called Gantt's bonus in the diagram.

As regards my proposed modification in general it is my idea that the spread of differential bonuses to the right and left of time allotted should extend each way to a point which is not a percentage of time allotted but a proportion of the base bonus time, varying more or less according to the degree of standardization of the job. The former procedure would be logical but it does not automatically correct the practice of offering a large bonus time alone on a difficult job which calls for more liberal fatigue allowance as well as more liberal reward. CHARLES W. MIXTER.

New Haven, Conn.

May Increase Manufacturers' Taxes

HARRISBURG, PA., February 1, 1915.—Estimates that the amount of money available for appropriation by the Legislature of Pennsylvania, now assembled here in biennial session, will fall from $9,000,000 to $11,000,000 short of the amount appropriated in 1913, have caused discussion of many new sources of revenue. Among them is the old proposition to impose a five-mill tax on the capital of manufacturing companies actually invested in manufacturing. This suggestion has been made regularly for the last 15 years, but this year, owing to demands for money for educational use and State highway construction, it is being strongly urged. Another scheme is for a land tax of from one-eighth to one-fourth of a mill on the dollar, which bids fair to be as unpopular an idea as the manufacturing tax. If the Supreme Court sustains the anthracite coal tax of 2½ per cent. ad valorem it is likely that efforts will be made to tax petroleum and natural gas and also to tax artificial gas companies.

The proposed workmen's compensation act and accompanying liability bills have been publicly advocated by Governor M. E. Brumbaugh in his inaugural address, and the bills are to be presented in a fortnight.

A. B. H.

Melville Medal for Mechanical Engineers

Admiral George W. Melville, past president and honorary member of the society, who died in March, 1912, left in his will a bequest of $1000, the income to be expended upon a gold medal and awarded annually for the best original paper or thesis submitted in competition. It has been decided by the council of the American Society of Mechanical Engineers that it will be necessary to allow the interest to accumulate for the purchase of a die for the medal before its award is instituted.

Proposed Legislation Against Industrial Railroads

WASHINGTON, D. C., February 2, 1915.—The sweeping revision of the commodities clause of the interstate commerce law for the avowed purpose of affecting the ownership of all so-called tap lines, industrial railroads and ore carrying roads, which claim to be common carriers, is being urged upon the Senate Committee on Interstate Commerce. The changes proposed are set forth in a bill introduced by Senator Pomerene, of Ohio, and intended to supplement the measure presented by him some weeks ago, proposing a complete reorganization of the Interstate Commerce Commission. The commodities clause in the existing law was intended to prevent a common carrier from operating a mine or manufacturing plant and marketing the output thereof. Its chief provision is as follows:

From and after May 1, 1908, it shall be unlawful for any railroad company to transport from any State, Territory, or the District of Columbia, to any other State, Territory, or the District of Columbia, or to any foreign country, any article or commodity, other than timber and the manufactured products thereof, manufactured, mined, or produced by it, or under its authority, or which it may own in whole or in part, or in which it may have any interest, direct or indirect, except such articles or commodities as may be necessary and intended for its use in the conduct of its business as a common carrier.

Attempts have been made from time to time to secure such construction of this clause as would prevent an industrial corporation from owning a railroad operated as a common carrier, but in all the cases thus far brought to the attention of the commission it has been shown either that the railroads in question were not common carriers or that their organization was separate and distinct to a degree that would probably induce the United States Supreme Court, in appellate proceedings, to reverse any ruling of the commission applying the prohibitions of the commodities clause. With a view, therefore, to clarifying the intent of this clause and extending it to cover every conceivable form of relation between a manufacturing corporation and a railroad, the subject of joint ownership, either direct or indirect, Senator Pomerene has drafted a provision amending the existing law to read as follows:

From and after the first day of January, 1917, it shall be unlawful for any railroad company subject to the act to regulate commerce, as amended, to transport in interstate or foreign commerce any article or commodity thereafter either (a) manufactured, mined, produced, or regularly dealt in; or (b) mined or produced from lands which at the time were owned or controlled, directly or indirectly, wholly or in part; or (c) manufactured, mined, or produced by any person, firm, association, or corporation in which there is any interest, direct or indirect; first, by it, or, second, under its authority, directly or indirectly; third, by any person, firm, association, or corporation controlled by it; or, fourth, by which it was controlled through stock ownership or otherwise; fifth, or by any corporation or association affiliated with it by having the same controlling shareholders or members; or, sixth, by being otherwise subject to a common control.

This prohibition shall not include timber and the manufactured products thereof and such articles or commodities as may be necessary and intended for the use of the railroad company in the conduct of its business as a common carrier, and classes (a) and (b) of the above-described prohibitions shall apply irrespective of where ownership or interest in the article or commodity is vested at the time of transportation.

The prospect for the reconvening of Congress soon after March 4 encourages the advocates of the bill to believe that it can be enacted into law in the coming year. As it will be strongly opposed by influential interests, however, it is obvious that it cannot be passed without a hard fought contest. W. L. C.

The Seattle Car & Foundry Company, Seattle, Wash., replying to an inquiry from this office, states that there is no truth in the report of a sale of cars to the Russian government. Press dispatches had announced that an order had been placed for 15,000 cars at Seattle.

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Benzol Recovery Plant at Johnstown, Pa.

Thomas A. Edison is building a benzol recovery plant at Johnstown, Pa., adjoining the by-product coke ovens of the Cambria Steel Company. The plant is largely Mr. Edison's own design and the process will embody features of his devising.

As a result of the disposal of the interests of the Willys-Overland Company, Toledo, in the plant of the Gramm Motor Truck Company, Lima, Ohio, the Willys-Overland Company will discontinue the manufacture of motor trucks and devote its entire attention to making passenger automobiles. The motor truck department of the Garford Motor Truck Company, Elyria, Ohio, which has been under the Willys-Overland control, will be transferred to the Lima plant. The Willys-Overland Company will continue to operate the Garford plant in Elyria. E. A. Williams, Jr., will be president and general manager of the Gramm Motor Truck Company; Joseph B. Immler, vice-president and treasurer, and A. Stull, secretary.

The plant of the Maiwurm German Aluminum Company, Ashland, Ohio, has been sold under bankruptcy proceedings to Frank J. Wensinger, who will operate it under the name of the German Aluminum Company.

The Ludlum Steel & Spring Company, 2 Rector street, New York City, has changed its name to the Ludlum Steel Company. It specializes in tool and alloy steels.

MORE STEEL WORKS IRON

January Increase Is 2763 Tons a Day

A Net Gain of 14 in Active Blast Furnaces and of 7400 Tons a Day in Capacity

Due entirely to the blowing in of steel works furnaces, January pig iron production rose to 1,601,421 tons, or 51,659 tons a day, as against 1,515,752 tons in December, or 48,896 tons a day. The merchant furnace production increased only 146 tons a day over that of December. Active capacity increased from 48,848 tons on January 1 to 56,270 tons on February 1, only two furnaces blowing out last month, while 16 were blown in. The Steel Corporation contributed 10 to the net gain of 14 furnaces in January.

DAILY RATE OF PRODUCTION

The daily rate of production of coke and anthracite pig iron by months, from January, 1914, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons

	Steel works	Merchant	Total
January, 1914	40,691	20,117	60,808
February	47,479	19,974	67,453
March	54,990	20,748	75,738
April	54,508	21,157	75,665
May	47,028	20,478	67,506
June	44,321	19,595	63,916
July	45,027	18,123	63,150
August	46,937	17,426	64,363
September	46,344	16,409	62,753
October	41,026	16,335	57,361
November	35,305	15,306	50,611
December	33,381	15,515	48,896
January, 1915	35,998	15,661	51,659

OUTPUT BY DISTRICTS

The accompanying table gives the production of all coke and anthracite furnaces in January and the three months preceding:

Monthly Pig-Iron Production—Gross Tons

	Oct. (31 days)	Nov. (30 days)	Dec. (31 days)	Jan. (31 days)
New York	112,818	113,675	126,271	121,292
New Jersey	6,860	6,910	6,973	6,564
Lehigh Valley	57,905	59,527	65,388	62,205
Schuylkill Valley	55,171	49,772	44,786	40,691
Lower Susquehanna and Lebanon Valley	33,988	33,674	30,836	32,535
Pittsburgh district	430,804	352,508	349,401	370,745
Shenango Valley	65,267	56,076	54,289	66,184
Western Pennsylvania	109,217	120,959	116,295	122,713
Maryland, Virginia and Kentucky	36,217	35,222	34,201	33,481
Wheeling district	75,014	51,593	52,194	54,563
Mahoning Valley	195,910	148,640	148,057	171,624
Central and Northern Ohio	130,473	130,850	117,473	119,349
Hanging Rock and S. W. Ohio	19,185	18,460	20,785	24,317
Chicago district	226,012	143,288	139,289	155,038
Mich., Minn., Mo., Wis. and Col.	49,518	41,355	49,944	60,218
Alabama	157,696	138,412	141,948	144,985
Tennessee	16,131	17,395	17,622	14,917
Total	1,778,186	1,518,316	1,515,752	1,601,421

PRODUCTION OF STEEL COMPANIES

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in the figures below, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Pig, total production			Spiegeleisen, ferromanganese, etc.		
	1913	1914	1915	1913	1914	1915
Jan.	1,981,560	1,261,430	1,115,944	15,633	17,325	18,041
Feb.	1,792,154	1,329,414	.....	20,131	10,524	.....
Mar.	1,904,878	1,704,688	.....	20,546	20,133	.....
Apr.	1,939,751	1,635,226	.....	23,108	18,676	.....
May	1,991,192	1,457,847	.....	19,042	21,504	.....
June	1,860,070	1,329,623	.....	19,212	16,254	.....
July	1,840,216	1,395,851	.....	22,310	16,524	.....
Aug.	1,833,352	1,455,054	.....	20,680	11,577	.....
Sept.	1,828,232	1,390,322	.....	24,555	13,786	.....
Oct.	1,848,634	1,271,820	.....	19,499	17,435	.....
Nov.	1,573,007	1,059,159	.....	26,765	21,977	.....
Dec.	1,298,262	1,034,802	.....	14,095	20,733	.....

CAPACITY IN BLAST FEBRUARY 1 AND JANUARY 1

The following table shows the daily capacity in gross tons of furnaces in blast February 1 and January 1, by districts:

Coke and Anthracite Furnaces in Blast

Location of furnaces	Total number of stacks	Feb. 1 Number in blast	Feb. 1 Capacity per day	Jan. 1 Number in blast	Jan. 1 Capacity per day
New York:					
Buffalo	19	10	3,461	10	3,421
Other New York	7	2	452	2	433
New Jersey	7	1	212	1	219
Pennsylvania:					
Lehigh Valley	22	7	1,825	7	1,876
Spiegel	2	2	179	2	180
Schuylkill Val.	16	4	1,313	4	1,445
Lower Susquehanna	7	2	520	2	438
Lebanon Valley	10	3	529	3	557
Pittsburgh Dist.	52	28	13,420	23	10,737
Ferro	4	2	230	2	285
Shenango Val.	19	7	2,610	5	1,751
Western Pa.	26	12	4,098	11	3,726
Ferro	1	1	30	1	25
Maryland	4	1	436	1	388
Wheeling Dist.	11	6	2,228	5	1,684
Ohio:					
Mahoning Val.	25	14	6,143	12	5,268
Central and Northern	24	10	4,239	9	3,553
Hanging Rock & S. W. Ohio	15	5	850	5	866
Ill. and Ind.	34	12	5,532	10	4,522
Ferro	2	1	101	1	99
Michigan, Wis. & Minn.	10	5	1,348	4	1,086
Colo. and Mo.	7	2	717	1	586
Ferro	1	0	0	1	38
The South:					
Virginia	24	3	423	3	407
Kentucky	5	1	217	1	197
Alabama	45	15	4,621	15	4,538
Ferro	1	1	55	1	41
Tennessee	20	4	481	4	482
Total	423	160	56,270	146	48,848

Among furnaces blown in in January were one Donora, one Carrie, three Duquesne and one Aliquippa (ferromanganese) in the Pittsburgh district, one New Castle and one Farrell in the Shenango Valley, one Cambria in western Pennsylvania, one Mingo in the Wheeling district, one Ohio and one Hazleton in the Mahoning Valley, one Central in northern Ohio, Jackson in the Hanging Rock district, one Gary and one Madeline in the Chicago district, and Zenith in Minnesota.

Furnaces blown out last month were one Lucy in the Pittsburgh district and Lawrence in the Hanging Rock district.

DIAGRAM OF PIG-IRON PRODUCTION AND PRICES

The fluctuations in pig-iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The figures for daily average production, beginning January, 1908, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1908—Gross Tons

	1908	1909	1910	1911	1912	1913	1914	1915
Jan.	33,918	57,975	84,148	56,752	66,384	90,172	60,808	51,659
Feb.	37,163	60,976	85,616	64,090	72,442	92,369	67,453	.....
Mar	39,619	59,232	84,459	70,036	77,591	89,147	75,738	.....
Apr.	38,289	57,962	82,792	68,836	79,181	91,759	75,665	.....
May	37,603	60,753	77,102	61,079	81,051	91,039	67,506	.....
June	36,444	64,656	75,516	59,585	81,358	87,619	63,916	.....
July	39,287	67,793	69,305	57,841	77,738	82,601	63,150	.....
Aug.	42,851	72,546	67,963	62,150	81,046	82,057	64,363	.....
Sept.	47,300	79,507	68,476	65,903	82,128	83,531	62,753	.....
Oct.	50,554	83,856	67,520	67,811	86,722	82,133	57,361	.....
Nov.	51,595	84,917	63,659	66,648	87,697	74,453	50,611	.....
Dec.	56,158	85,022	57,349	65,912	89,766	63,987	48,896	.....

THE RECORD OF PRODUCTION

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1911—Gross Tons

	1911	1912	1913	1914	1915
Jan.	1,759,326	2,057,911	2,795,331	1,885,054	1,601,421
Feb.	1,794,509	2,100,815	2,586,337	1,888,670	.....
Mar.	2,171,111	2,405,318	2,763,563	2,347,867	.....
Apr.	2,064,086	2,375,436	2,752,761	2,269,955	.....
May	1,893,456	2,512,582	2,822,217	2,092,686	.....
June	1,787,566	2,440,745	2,628,565	1,917,783	.....
July	1,793,068	2,410,889	2,560,646	1,957,645	.....
Aug.	1,926,637	2,512,431	2,545,763	1,995,261	.....
Sept.	1,997,102	2,463,839	2,505,927	1,882,577	.....
Oct.	2,102,147	2,689,933	2,546,261	1,778,186	.....
Nov.	1,999,433	2,630,854	2,233,123	1,518,316	.....
Dec.	2,043,270	2,782,737	1,983,607	1,515,752	.....

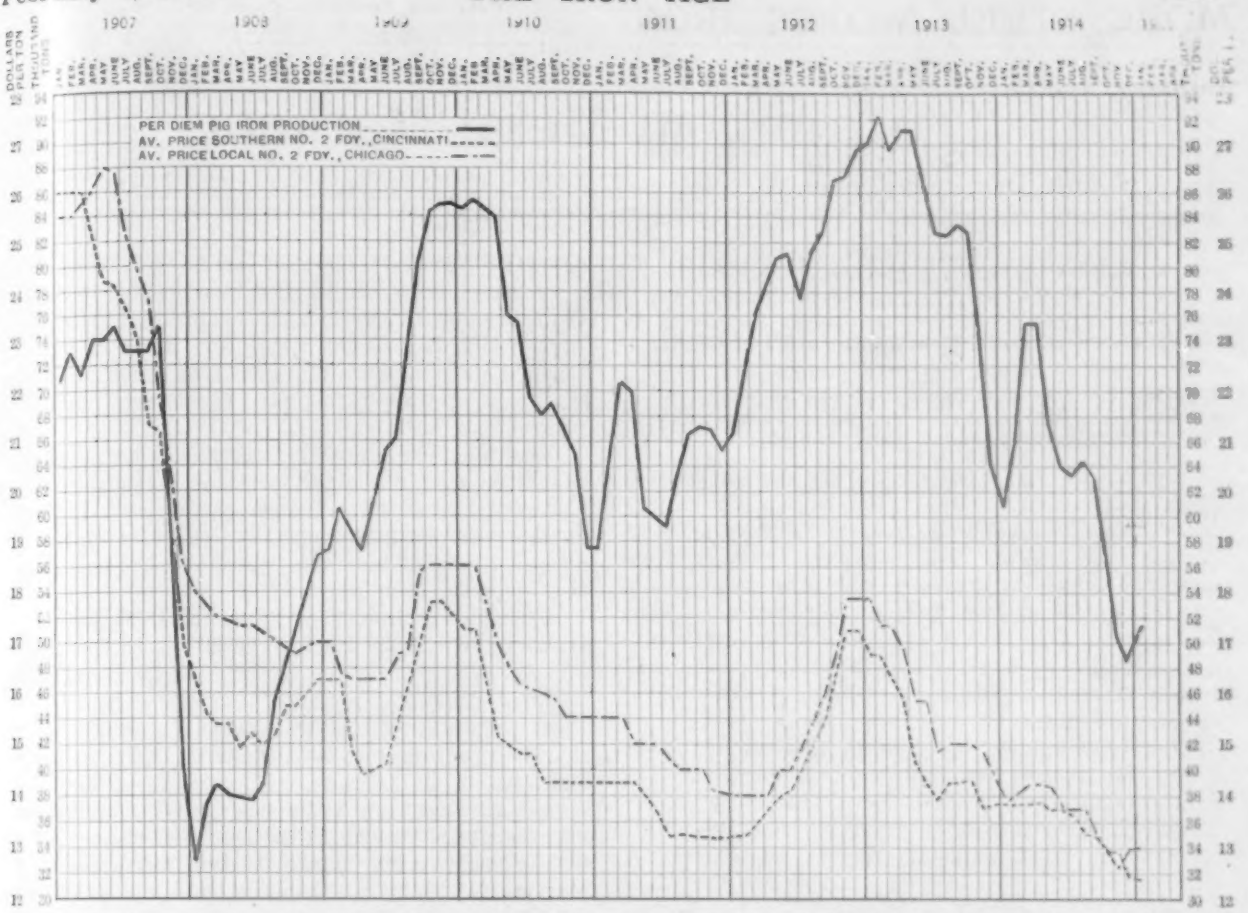

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to February 1, 1915: Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Blast Furnace Notes

No. 2 blast furnace of the Pittsburgh Crucible Steel Company located at Midland, Pa., broke all its previous daily and weekly records in January, with an output of 15,002 tons. It was blown in last September and has done excellent work.

In the Pittsburgh district 30 furnaces were in blast February 1, representing a net increase of five in the month of January.

The furnace of the Oriskany Ore & Iron Corporation near Lynchburg, Va., will be blown in early in February.

Lawrence furnace of the Marting Iron & Steel Company at Ironton, Ohio, was blown out January 3. Marting furnace of the same company is still in blast.

German Steel Syndicate's December Output

The output of the German Steel Works Union for December was 268,189 metric tons, against 246,088 tons in November, 1914, and 457,472 tons in December, 1913, a decrease from the previous year of 189,283 tons. In semi-finished steel the output was 49,893 tons, an increase of 11,176 tons over November; in railroad material, 167,877 tons, an increase of 17,966 tons, and in shapes, 50,419 tons, a decrease of 7041 tons from November. The data for the other months of the war were published in *The Iron Age* of January 21, 1915. The expansion of semi-finished steel in December over November is not explained, but the increase in railroad material is due to deliveries to the State railroads.

The Portsmouth Steel Company, Portsmouth, Ohio, has dismantled its plate mill, which is now for sale. It is an 84-in. mill. The company expects to give most of its attention to the manufacture of sheets. The changes it is now making will give a total of 12 mills, two of them being jobbing mills. It is hoped to have the changes completed about April 1. Its Cincinnati office has been moved from the Union Trust Building to more commodious quarters in the Johnston Building, opposite Fountain square.

Cleveland Crane's Monthly Dinner

The holding of a monthly dinner and social meeting of employees and officers is a new form of activity on the part of the Cleveland Crane & Engineering Company, Wickliffe, Ohio. The object of these meetings is to cement further the bond of fellowship and good will between the company and its employees and to show the interest that the former takes in the welfare of the latter. Work previously inaugurated in this direction includes a school of apprentices, a bonus system, the opening of an allotment for building homes for employees and an employees' aid society. The first of these dinners was held at the Wickliffe Church, January 21, and was attended by about 80 of the workmen and officers. After the dinner a musical programme was rendered by the shop orchestra and an interesting paper on the development of the art of founding, illustrated by lantern slides, was presented by Thomas D. West, of the West Steel Castings Company, Cleveland. C. C. Robbins, president of the company, gave a brief talk before introducing the speaker.

Association of Iron and Steel Electrical Engineers

The Association of Iron and Steel Electrical Engineers will hold a meeting on the evening of Saturday, February 6, at the Seventh Avenue Hotel, Pittsburgh, Pa. A paper entitled "The Relation of Physical Examination to Electrical Work" is to be read by Stewart C. Coey, of the Youngstown Sheet & Tube Company. Among those who are expected to address the meeting on the same subject are Dr. Sidney McCurdy, resident surgeon of the Youngstown Sheet & Tube Company, and Dr. William O'Niel Sherman, chief surgeon of the Carnegie Steel Company.

The Niles Tool Works Company, Hamilton, Ohio, at its stockholders' meeting January 26, re-elected the following officers: President, James K. Cullen; vice-president, George T. Reiss; secretary, Charles L. Cornell; assistant secretary, Miles T. Watts; treasurer, Joseph L. Blair.

The Iron and Metal Markets

GAIN IN STEEL OUTPUT

Some Further Increase Is Promised

Efforts to Advance Bars, Plates and Shapes—Lower Sheet Mill Wages

Since the steel companies were responsible for practically all of it, the January increase in pig-iron production gives a measure of the gain in steel works output. Our statistics show a total make of 1,601,421 tons of pig iron last month, against 1,515,752 tons in December, a gain of 85,669 tons, or 2763 tons a day. The steel works furnaces made 1,115,944 tons in January, against 1,034,802 tons in December, a gain of 81,000 tons or about 8 per cent.

The total number of furnaces in blast February 1 was 160, against 146 on January 1, the Steel Corporation contributing 10 to the increase and the independent steel companies 4. The capacity of all furnaces in blast February 1 was 56,270 tons a day against 48,848 tons a day one month previous. The Steel Corporation is to put three additional furnaces in blast this week—one Lorain and two Shoenberger.

Operations in the Steel Corporation's plants are now on the basis of nearly 55 per cent. of ingot capacity. Its statement of unfilled orders as of January 31 is expected to show an increase of 150,000 to 200,000 tons.

The feeling in the steel trade this week is better, and the larger companies look for a further moderate increase in output in the next six weeks.

The increased ability of the railroads to get money and its further accumulation are factors in the situation of which more is heard. Rail buying is still far from normal, but each week adds to the total. The Chicago & Northwestern has placed 27,000 tons; the Nickel Plate, 2500 tons; the Erie, over 30,000 tons, of which 22,000 tons went to Pittsburgh and 6000 tons to Chicago; the Boston & Maine, 15,000 tons, which will be delivered from Buffalo via Erie Canal; the B. & O., about 25,000 tons, of which 7000 tons went to the Carnegie Steel Company and 5000 to the Illinois Steel Company. The Maine Central is in the market for 8500 tons.

Several manufacturers of bars, plates and shapes in the Central West have announced that while sales for February will be made at 1.10c., the price for March deliveries will be 1.15c. and for the second quarter 1.20c. As heretofore, volume of business will decide how far these prices can be maintained, and their announcement may stimulate February bookings. Plates in particular are not firm at 1.10c.

Sheet manufacturers operating union mills now have up with the Amalgamated Association the question of wage reductions to meet those made by some mills which do not sign the scale. These have amounted to 10 to 15 per cent. In other mills, also, the severe conditions of recent months have been met by a system under which fewer men are employed for a given output. In galvanized sheets, the spelter situation has brought a further advance, and 3c. is now asked for No. 28.

Structural lettings have fallen off, but there are several February prospects, including 9500 tons for a bridge at Portland, Oregon, and 7500 tons for the Clark Avenue bridge at Cleveland. Apart from their portion of the 22,000 tons for the Indianapolis track elevation, the Pennsylvania lines east and west will require 22,000 tons for bridge work this year.

The National Tube Company has shortened discounts on second quarter business, so that on April shipments $2 a ton advance is now quoted and $4 on May and June business. In the wire trade talk of a further advance has appeared before the recent one has been digested.

Foreign inquiries for shrapnel steel and other products is still of good volume, but in the uncertainties of the freight situation the average manufacturer is not following them up sharply. The Steel Corporation's trade abroad is nearly up to that before the war, but its distribution is vastly different.

Ferromanganese users are showing more concern about the future, as the stocks of some of them are uncomfortably small. Some importers have been led to think that Great Britain is about to lift the bars for them under stiff guarantees concerning steel exports.

The pig iron market gives an occasional sign of life in the Middle West. The best feature is the steadiness of shipments, with indications here and there that foundries are doing a little better.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	Feb. 3, 1915.	Jan. 27, 1915.	Jan. 6, 1915.	Feb. 4, 1914.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia...	$14.25	$14.25	$14.25	$14.75
No. 2, Valley furnace....	13.00	13.00	13.00	13.00
No. 2 Southern, Cin'ti...	12.40	12.40	12.40	13.75
No. 2, Birmingham, Ala..	9.50	9.50	9.50	10.50
No. 2, furnace, Chicago*	13.00	13.00	13.00	14.00
Basic, del'd, eastern Pa.	13.50	13.50	13.50	14.00
Basic, Valley furnace...	12.50	12.50	12.50	13.00
Bessemer, Pittsburgh....	14.55	14.55	14.70	14.90
Malleable Bess., Ch'go*..	13.00	13.00	13.00	14.00
Gray forge, Pittsburgh..	13.45	13.45	13.45	13.65
L. S. charcoal, Chicago..	15.75	15.75	15.75	15.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh..	19.50	19.50	19.00	21.00
O.-h. billets, Pittsburgh..	19.50	19.50	19.00	21.00
O.-h. sheet bars, P'gh....	20.50	20.50	20.00	22.00
Forging billets, base, P'gh	24.00	24.00	24.00	25.00
O.-h. billets, Phila.....	21.40	21.40	21.40	22.40
Wire rods, Pittsburgh...	25.00	25.00	25.00	26.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	11.50	11.50	11.25	13.00
Iron rails, Philadelphia..	13.00	13.00	13.00	16.50
Carwheels, Chicago.....	10.00	10.00	9.75	12.25
Carwheels, Philadelphia..	*10.50*	11.00	11.00	12.50
Heavy steel scrap, P'gh.	11.50	11.50	11.50	12.25
Heavy steel scrap, Phila.	10.00	10.00	10.00	11.00
Heavy steel scrap, Ch'go.	9.25	9.25	9.00	10.25
No. 1 cast, Pittsburgh....	11.25	11.25	11.25	11.25
No. 1 cast, Philadelphia.	12.00	12.00	12.00	12.50
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.25	10.75
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.20	1.20	1.17½	1.22½
Iron bars, Pittsburgh....	1.10	1.10	1.15	1.35
Iron bars, Chicago.....	1.00	1.00	0.97½	1.10
Steel bars, Pittsburgh....	1.10	1.10	1.10	1.20
Steel bars, New York....	1.26	1.26	1.26	1.36
Tank plates, Pittsburgh..	1.10	1.10	1.10	1.20
Tank plates, New York..	1.26	1.26	1.26	1.36
Beams, etc., Pittsburgh..	1.10	1.10	1.10	1.20
Beams, etc., New York...	1.26	1.26	1.26	1.36
Skelp, grooved steel, P'gh	1.10	1.10	1.10	1.20
Skelp, sheared steel, P'gh	1.15	1.15	1.15	1.30
Steel hoops, Pittsburgh..	1.20	1.20	1.20	1.30

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers.	Feb. 3, 1915. Cents.	Jan. 27, 1915. Cents.	Jan. 6, 1915. Cents.	Feb. 4, 1914. Cents.
Sheets, black, No. 28, P'gh.	1.80	1.80	1.80	1.95
Galv. sheets, No. 28, P'gh.	3.00	2.90	2.75	2.95
Wire nails, Pittsburgh	1.55	1.55	1.50	1.60
Cut nails, Pittsburgh	1.50	1.50	1.50	1.60
Fence wire, base, P'gh.	1.35	1.35	1.30	1.40
Barb wire, galv., P'gh.	1.95	1.95	1.90	2.00
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$1.50	$1.50	$1.50	$1.85
Furnace coke, future	1.65	1.65	1.75	2.00
Foundry coke, prompt	2.00	2.00	2.00	2.50
Foundry coke, future	2.15	2.15	2.15	2.60
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	15.00	14.62½	13.50	15.00
Electrolytic copper, N. Y.	14.75	14.37½	13.00	14.75
Spelter, St. Louis	7.85	7.30	5.60	5.25
Spelter, New York	8.00	7.50	5.75	5.40
Lead, St. Louis	3.62½	3.52½	3.60	4.05
Lead, New York	3.80	3.70	3.80	4.15
Tin, New York	37.80	35.50	33.25	40.87½
Antimony, Hallett's, N. Y.	17.00	17.00	14.00	7.00
Tin plate, 100-lb. box, P'gh	$3.10	$3.10	$3.10	$3.25

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.10c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.35; galvanized, $1.75. Galvanized barb wire and fence staples to jobbers, $1.95; painted, $1.55. Wire nails to jobbers, $1.55. Woven wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	1.90	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Wire Rods.—Bessemer, open-hearth and chain rods, $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from November 2, 1914, and iron pipe from June 2, 1913, all full weight.

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛, ¼ and ⅜	74	53½	⅛ and ¼	66	47
½	78	67½	⅜	65	46
¾ to 3	81	72½	½	69	56
			¾ to 2½	72	61

Lap Weld

2	78	69½	1¼	56	45
2½ to 6	80	71½	1½	67	56
7 to 12	77	66½	2	68	58
13 and 14	63½	..	2½ to 4	70	61
15	61	..	4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted

1 to 3, butt	79	70½	1 to 1½, butt	70	59
2, lap	76	67½	2, butt	70	59
2½ to 6, lap	78	69½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends

¼, ⅜ and ⅝	69	58½	⅜	63	52
½	74	67½	½	67	60
¾ to 1½	78	71½	¾ to 1¼	71	62
2 to 3	79	72½	2 and 2½	72	63

Lap Weld, extra strong, plain ends

2	75	66½	1½	65	59
2½ to 4	77	68½	2	66	58
4½ to 6	76	67½	2½ to 4	70	61
7 to 8	69	58½	4½ to 6	69	60
9 to 12	64	53½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	64	57½	½	57	49
¾ to 1½	67	60½	¾ to 1½	60	52
2 to 2½	69	62½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends

2	65	58½	2	55	49
2½ to 4	67	60½	2½ to 4	60	54
4½ to 6	66	59½	4½ to 6	59	53
7 to 8	59	48½	7 to 8	52	42

To the large jobbing trade an additional 5 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.	49
2½ and 2¾ in.	65	2¼ in.	45
3 and 3¼ in.	70	2½ and 2¾ in.	54
3½ and 4½ in.	72	3 and 3¼ in.	57
5 and 6 in.	65	3½ and 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.25 to 1.30
Nos. 9 to 10	1.30 to 1.35
Nos. 11 and 12	1.35 to 1.40
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.55 to 1.60

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	2.00
No. 12	2.10
Nos. 13 and 14	2.10
Nos. 15 and 16	2.20
Nos. 17 to 21	2.40
Nos. 22 and 24	2.50
Nos. 25 and 26	2.70
No. 27	2.85
No. 28	3.00
No. 29	3.15
No. 30	3.30

Pittsburgh

PITTSBURGH, PA., February 2, 1915.

The steel market looks much better this week, all developments having been favorable. Effective Monday, February 1, the Carnegie and Jones & Laughlin steel companies put prices on plates, shapes and bars for prompt specifications in February at 1.10c.; March, 1.15c., and for second quarter, 1.20c. The spectacular rise in spelter has brought another advance in galvanized sheets, which are now held at 3c. for No. 28 for prompt specifications. The greatest encouragement is found in the increased operations among blast furnaces and steel works, a remarkable gain having been made since January 1. In January the Carnegie Steel Company put in 6 blast furnaces, and is now operating 30 out of 58 stacks. The Youngstown Sheet & Tube Company expects to blow in another stack late this month, and several other companies say they will probably increase their furnace operations within a short time. In November the Youngstown Sheet & Tube Company operated to only 35 per cent. and in December 45 per cent., while at present it is operating to over 65 per cent. The Steel Corporation is operating this week to between 55 and 60 per cent. of ingot capacity. This increased rate of operations means that the mills are getting actual orders for rolling. Prices on tin plate are firmer, due to the advance in pig tin. The scrap market has firmed up again, and the tone of the coke market is stronger. The Amalgamated Association is in session to-day (Tuesday) with the sheet mills that sign the scale, and it is probable will agree to make concessions in the present wage scale, in order to offset the reductions in wages that have been made by independent mills that do not sign its scale. It is understood that a number of sheet mills have made reductions in wages ranging from 10 to 15 per cent. or more.

Pig Iron.—W. P. Snyder & Co. report the average price of Bessemer iron in January to have been $13.6375, a decline of 11c. from the December average, while the basic average remains at $12.50 for January, the same as in December, these prices being f.o.b. Valley furnace. The local pig iron market is quiet, but on account of increased operations among the steel works prices are reported slightly firmer. A sale of a considerable amount of basic iron is reported at $12.50, Valley furnace, but details are not yet available. We note a sale of 6000 tons of gray forge iron for delivery up to July at $12.50, Valley, or $13.45, Pittsburgh, also a sale of 2500 tons of malleable Bessemer iron for the same delivery at $13 at nearby furnace, this iron not coming from the Valley. A sale of 500 tons of basic is noted at $12.50, Valley furnace. We quote Bessemer iron at $13.60; basic, $12.50; malleable Bessemer, $12.75; No. 2 foundry, $13 to $13.25, and gray forge, $12.50, all at Valley furnace, with a freight rate of 95c. a ton for delivery in the Cleveland and Pittsburgh districts.

Billets and Sheet Bars.—The demands of regular customers of the Carnegie Steel Company for sheet bars have increased to such an extent recently, particularly from the American Sheet & Tin Plate Company, that the Carnegie Company has retired from the market as an active seller of sheet bars, having all the obligations on its books that it will be able to take care of for some time to come. In January actual orders sent to the mills for rolling by the rail and billet bureau of the Carnegie Company showed an increase of more than 35 per cent. over December. An unusual condition exists in the steel market in the Youngstown district, prices on billets and sheet bars there being relatively lower than in Pittsburgh, even by adding the $1 a ton freight to Pittsburgh. We quote Bessemer and open-hearth billets at $18 to $18.50, and Bessemer and open-hearth sheet bars $19, f.o.b. maker's mill, Youngstown; Bessemer and open-hearth billets, $19.50 to $20, and Bessemer and open-hearth sheet bars, $20.50 to $21, f.o.b. maker's mill, Pittsburgh. Forging billets are quoted at $24 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take $1 per ton extra. Axle billets are quoted at $21 to $22.

Ferroalloys.—The situation in ferromanganese is giving consumers much concern. Deliveries on contracts are not being made, and stocks held by consumers are in many cases nearly depleted. Importers who have stocks at seaboard points are asking higher prices, quoting from $75 to $80 in carloads for prompt shipment. Importers are still quoting nominally $68, seaboard, but can give no assurance of delivery, even within three or four months. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20, and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—The Carnegie Steel Company has taken 22,000 tons from the Erie Railroad. Of the Baltimore & Ohio order this company received 7000 tons and the Illinois Steel Company 5000 tons. The rolling schedules for the Edgar Thomson rail mills of the Carnegie Steel Company are in better shape now than for a long time, the company having a good deal of foreign and domestic business booked. The new demand for light rails is more active than for some months, the Carnegie Steel Company having taken new orders and specifications in the past week for about 3500 tons. We quote standard section rails made of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and 10 lb. sections, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c.

Structural Material.—New inquiry in the past week was a little more active. The American Bridge Company has taken 2200 tons for the Parkersburg-Ohio highway bridge at Parkersburg, W. Va. Bids will go in within a few days on a city viaduct at Cleveland, Ohio, 9500 tons. We quote beams and channels up to 15-in. at 1.10c. for February shipment, 1.15c. for March, and 1.20c. for second quarter.

Plates.—The Carnegie Steel Company is low bidder on 1900 tons of plates for 12 barges to be built by the Government for use at the Mare Island navy yard. We quote ¼-in. and heavier plates at 1.10c., f.o.b. Pittsburgh, for February shipment, 1.15c. for March, and 1.20c. for second quarter.

Tin Plate.—Mills report that specifications against contracts are coming in freely and operations are increasing. The American Sheet & Tin Plate Company is operating this week to about 90 per cent. of capacity, and the Phillips Sheet & Tin Plate Company has started up its Steubenville plant containing 12 hot mills. Prices on tin plate are firmer, due to the advance in pig tin, but very few new orders are being placed, as the con-

suming trade is covered for this year. We quote 100 lb. 14 x 20 coke plates at $3.10 to $3.20, prices depending on the order.

Sheets.—The continued rise in spelter has brought another advance in prices of galvanized sheets, which are now held by nearly all the makers at 3c. for No. 28, for prompt shipment only, no contracts being accepted at this price. The new demand for black and galvanized sheets is heavier than for some time, and mills report specifications coming in freely. There is a good demand for foreign shipment, and considerable business of this kind is being taken by the American Sheet & Tin Plate Company and other interests. We quote No. 28 Bessemer black sheets at 1.80c., No. 28 galvanized at 3c., Nos. 9 and 10 blue annealed sheets, 1.30c. to 1.35c., with some sellers holding for the higher price; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Wire Rods.—The new demand is dull, as consumers are covered by contract mostly up to July 1, and specifications are coming in at a fair rate. Foreign demand for wire rods has quieted down and very little is doing. We quote Bessemer, open-hearth and chain rods at $25, f.o.b. Pittsburgh, and the market is firm at this price.

Shafting.—Makers report new demand more active and specifications against contracts, especially from the automobile trade, are coming in freely. The implement makers are also specifying at a better rate than in December and early January. We quote cold-rolled shafting at 67 to 68 per cent. off, delivered in base territory.

Railroad Spikes.—Railroads have pretty well covered their needs in spikes for 1915 and will likely commence to specify against their contracts about March 1. Several roads which have not yet covered have inquiries out for 12,000 to 15,000 kegs. We quote railroad spikes at $1.35 to $1.40, and small spikes at $1.45 to $1.50, in carload and larger lots, f.o.b. Pittsburgh, for first half.

Skelp.—New demand is quiet, but prices are firmer than for some time. We quote: Grooved steel skelp, 1.10c. to 1.15c.; sheared steel skelp, 1.15c. to 1.20c.; grooved iron skelp, 1.50c.; sheared iron skelp, 1.50c. to 1.60c., delivered to consumers' mills in the Pittsburgh district.

Hoops and Bands.—As consumers are covered by contracts up to April or longer, the new demand is quiet. Specifications are only fair. We quote steel bands at 1.10c., with extras as per the steel bar card, and steel hoops at 1.20c. to 1.25c., Pittsburgh, for first quarter delivery.

Wire Products.—The expected advance of $1 a ton in wire products to become effective from Monday, February 1, was not made, but it is looked for within the next week or two. Jobbers and the larger retail hardware trade are covered on wire nails and wire up to April 1, and specifications are coming to the mills actively. The heavy advance in the price of spelter has caused all the concerns making wire to take orders for galvanized wire products very cautiously. Even if no advance is made in wire nails, a higher market on galvanized wire products is looked for in the near future. Prices on new orders, which are very light, are as follows: Wire nails, $1.55; plain annealed wire, $1.35; galvanized barb wire and fence staples, $1.95; painted barb wire, $1.55, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. for cash in 10 days. Prices on woven wire fencing are 73 per cent. off in carload lots, 72 per cent. on 1000-rod lots and 71 per cent. on small lots, f.o.b. Pittsburgh.

Iron and Steel Bars.—The Republic, Carnegie and Jones & Laughlin companies are now quoting 1.10c. on steel bars for February shipment, 1.15c. for March, and 1.20c. for second quarter. Consumers are covered by contracts made in December, and mills report specifications heavy. The implement trade is taking in steel bars at a good rate, and shipments by the mills are larger than for some time. The new demand for reinforcing steel bars is heavy. The mills rolling common iron bars report business light, and prices show no betterment. We quote steel bars for February shipment at 1.10c.; March, 1.15c., and for second quarter, 1.20c., f.o.b. Pittsburgh. Common iron bars, made from part scrap, are 1.10c. to 1.15c., makers' mill.

Merchant Steel.—New demand is more active, but is still mostly for small lots to cover current needs. The large consuming trade is covered by contracts up to April, and in many cases up to July, but specifications are only fair. Prices are more or less uneven, and on small lots for prompt shipment are about as follows: Iron finished tire, ½ x 1½ in., and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c.

Cold-Rolled Strip Steel.—Makers report new demand heavier and specifications against contracts taken in December are coming in quite freely. It is claimed that $2.75 is now minimum on new orders and is not being shaded. We quote as follows: Hard-rolled steel, 1½-in. and wider, under 0.20 carbon, sheared or natural mill edges, per 100 lb., $2.75 delivered. Extras, which are standard among all the mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier	Base	$0.25	$0.10
0.099 to 0.050	$0.05	0.25	0.15
0.049 to 0.035	0.20	0.25	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only

Wrought Pipe.—The National Tube Company has notified its sales agents throughout the country that they may take orders for wrought steel pipe for April delivery at one point lower, or $2 a ton advance, and for May and June at two points lower, or about $4 a ton advance. The company has not advanced its prices but is simply giving customers the privilege of placing orders at prices for second quarter delivery at the advance noted in case they care to do so. The National Tube Company has taken an order for 100 miles of 6-in. pipe for an oil line for delivery in the Southwest. The new demand for wrought-iron and steel pipe is reported heavier, and the mills anticipate a larger volume of new business as soon as outside operations open up. It is believed developments in the gas and oil fields in the West this year will be heavy, and this means a large consumption of line pipe. Discounts on iron and steel pipe are firm.

Boiler Tubes.—Most consumers are covered by contracts up to April 1, and specifications are fair. The new demand for both locomotive and merchant tubes is quiet. Discounts on tubes are more or less shaded, depending on the order.

Coke.—Since January 1 the Carnegie Steel Company has blown in a number of blast furnaces and its consumption of coke has materially increased. This has resulted in the H. C. Frick Coke Company starting up about 2500 ovens that have been idle for some time to supply coke to these furnaces, and it will likely start more this month. As several other steel companies are talking of blowing in idle furnaces within a short time the consumption of coke is likely to increase in the near future. This has given the coke trade a stronger tone. At present no large contracts are under negotiation, as active consumers are covered. We quote standard makes of blast furnace coke for prompt shipment from $1.50 to $1.55; on contracts for delivery up to July 1, at $1.65, and for delivery over the entire year, $1.75 per net ton at oven. Standard makes of 72-hr. foundry coke are still held at about $2 for prompt shipment and from $2.15 up to $2.50 per net ton at oven on contracts for delivery up to July 1, or later. Two concerns, whose foundry coke has a high reputation for quality among

consumers, state they have taken contracts recently on the basis of $2.50 per net ton at oven. The Connellsville Courier reports the output of coke in the upper and lower Connellsville regions for the week ending January 23 as 214,210 net tons, an increase over the previous week of nearly 8000 tons.

Old Material.—While the demand for scrap is not as active as it was two or three weeks ago, the market is firm and showing indications of a heavier demand in the near future. Operations among steel works have increased from 15 to 20 per cent. over December, and this means a heavier consumption of steel-making scrap. Dealers are not eager to sell. It is claimed that several small sales of selected heavy steel scrap have been made at $12, delivered. Prices on heavy steel scrap, borings and turnings, bundled sheet scrap and compressed side and end sheet scrap are stronger this week than last. Several dealers are holding heavy steel scrap at $11.75 to $12, and will not shade the lower figure. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights dealers quote as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$11.50 to $11.75
Compressed side and end sheet scrap	10.25 to 10.50
No. 1 foundry cast	11.25 to 11.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.25 to 9.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.00 to 10.25
Railroad grate bars	8.50 to 8.75
Low phosphorus melting stock	13 25 to 13.50
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	9.75 to 10.00
No. 2 busheling scrap	7.00 to 7.25
Machine shop turnings	7.50 to 7.75
Old carwheels	10.75 to 11.00
Cast-iron borings	8.00 to 8.25
*Sheet bar crop ends	12.00 to 12.25
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	10.75 to 11.00

*Shipping point.

Chicago

CHICAGO, ILL., February 3, 1915.—(*By Wire.*)

The announcement by one steel company a week ago of an advance on steel bars, plates and shapes to the basis of 1.15c., March 1, and 1.20c. for the second quarter has been followed by similar announcements by most of the other large mill interests. The basis for this advance, so far as it has to do with heavier tonnages booked by the mills, is to be found more in the Pittsburgh district than in this territory, but it is believed that a higher market level is desirable from the standpoint of consumer and producer alike, and the extent of the inevitable concessions from whatever may be regarded as the market level is not likely to be relatively greater at the advance. The principal rail business of the week was the placing of about 25,000 tons by the Chicago & Northwestern with the Illinois Steel Company. Future rail prospects still aggregate a considerable tonnage, but contracting for track fastenings appears to be fairly complete for the time. Added to the car inquiries previously mentioned, of which none seems to have been closed as yet, is that of the Burlington for a total of about 1700. This road is also in the market for a number of locomotives. New structural business is decidedly meager, contracts for fabricated steel reported here during the week aggregating but little over 2000 tons. Reinforcing bar business placed in this market totals fully as much, of which the principal contracts were 700 tons for a railroad elevator at Baltimore, taken by an Eastern mill, 1100 tons for a local warehouse and 500 tons at Minneapolis. In competition for this business there appeared no disposition to shade prices based on 1.10c., Pittsburgh. Upon plates alone is there any decided irregularity, and quotations as low as 1.05c., Pittsburgh, have been made, although very attractive orders have also been taken at regular quotations. The deadlock affecting the galvanized sheet market continues with no more definite prospect of solution. What little business is being placed is limited to immediate shipment at prices equivalent to 2.90c., Pittsburgh. Pig-iron transactions involved a tonnage of fair proportions, and trading for the time being is influenced to an unusual degree by a furnace campaign to move accumulations of special analysis iron.

Pig Iron.—The current pig-iron market offers little occasion of special nature to attract the consumer who is not in actual need of tonnage or of covering for requirements. Where off-grade iron, particularly of low silicon analysis, can be used, it is possible to buy iron of standard grading in combination at figures which, if averaged, suggest attractive purchases. Of such trading there is reported a considerable volume, and in a number of instances round tonnages have been booked. On straight sales of regularly graded irons the furnace price of $13 for Northern brands appears to be maintained without variance. There has been a degree of activity in Southern iron at the still prevailing price of $9.50, Birmingham, though an occasional report intimates even lower quotations. Interest in malleable iron is still hampered by the limited operations of malleable foundries. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 2, 3 and 5	$15.75
Lake Superior charcoal, Nos. 1 and 6	16.75
Northern coke foundry, No. 1	$13.25 to 13.75
Northern coke foundry, No. 2	13.00 to 13.25
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	13.75 to 14.25
Southern coke, No. 2 f'dry and 2 soft	13.50 to 13.75
Malleable Bessemer	13.00 to 13.25
Standard Bessemer	15.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

(*By Mail*)

Rails and Track Supplies.—The railroad buying of the past few weeks, while a distinctly welcome contrast to the orders of several months previous, does not represent much more than one-third of the tonnage normally taken. There is still a fair rail tonnage in sight. Tie-plate negotiations, which have been previously commented upon, are now pretty generally completed, which situation is also very largely true of the contracting for spikes and bolts, though the Milwaukee is still in the market for about 15,000 kegs of spikes. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, $23.50 to $25, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb., 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

Structural Material.—There is scarcely a structural job of importance in this entire territory now up for figures and the situation is exceedingly dull except for the interest attaching to the few car inquiries which have recently appeared. The latest of these is one for 1500 box cars and about 200 gondolas from the Burlington in addition to its previous inquiry for center sills. Contracts for fabricated steel reported during the week include 738 tons for a city of Chicago water tunnel, awarded to the Chicago Bridge & Iron Company; 400 tons for the Midland Warehouse Company, Chicago, to North Works, Illinois Steel Company; 300 tons for a high school, El Paso, Texas, to the El Paso Foundry & Machine Company. Other miscellaneous contracts aggregating about 500 tons are reported. In this market mill orders for structural material are coming in very slowly but prices not only are showing no weakness but have been maintained in a manner consistent with the advance just announced. We quote for Chicago delivery of plain shapes from mill, 1.289c.

We quote for Chicago delivery of structural material from store 1.75c.

Plates.—Plate tonnage is exceedingly scarce and for certain classes of business prices as low as 1.05c., Pittsburgh, are being made for prompt delivery in this territory. But on business involving a full range of

sizes, 1.10c., Pittsburgh, appears to be fairly well maintained, an order for 1000 tons taken at this price for prompt shipment being noted. The Burlington lines are reported to be in the market for a number of locomotives. We continue to quote for Chicago delivery of plates from mill 1.239c. to 1.289c.

We quote for Chicago delivery of plates out of stock 1.75c.

Sheets.—Makers of galvanized sheets find themselves no nearer a solution of the situation in which they have been involved by reason of the rise in spelter prices. The largest interests are still declining to quote and have not done so for 10 days. Other mills are quoting for immediate specifications only and are asking 2.90c., Pittsburgh. Buying is of course limited to pressing needs, mill deliveries being sufficiently prompt so that even at the advance of $4 a ton mill orders have the advantage over store prices. Business in blue annealed and black sheets is light and prices are unchanged. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.489c.; No. 28 black, 1.989c.; No. 28 galvanized, 2.939c. to 3.089c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

Bars.—Steel-bar specifications in January ran ahead of those of December by about 50 per cent., but are still considerably below normal volume. Reinforcing steel is a much more lively feature of the market, the business of the week including 1000 tons for the Midland Warehouse, Chicago, to be rolled from high carbon billets and 500 tons for the city of Minneapolis. For the latter work bids were uniformly based on 1.10c., Pittsburgh, and the contract went to the Corrugated Bar Company. It is reported that an offer of 1200 to 1500 tons of reinforcing bars by a Western user at 1.05c., Pittsburgh, for prompt shipment has found no takers. Bar iron is well established on a minimum basis of 1c., a result attributable almost entirely to the heavier tonnages recently booked. We quote for mill shipments as follows: Bar iron, 1c. to 1.05c.; soft steel bars, 1.289c.; hard steel bars, 1.20c.; shafting in carloads, 65 to 68 per cent. off; less than carloads, 60 to 65 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60-65 per cent. off.

Rivets and Bolts.—Prices made in a number of recent bolt and nut transactions, particularly in the securing of railroad business, have brought to light a market level of quotations lower no doubt than many manufacturers are willing to meet. There are in fact some indications that the local market in particular has yielded to the pressure of competitive conditions, but while the most recent instances of very low quotations appear to have been made for railroad business, the situation in some respects represents a failure to recover from a demoralized condition existent for some time rather than a new departure from higher nominal quotations. We have revised quotations as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 85-10 to 85-5; cut thread, 85-5 to 85; larger sizes, 80-10 to 80-5; machine bolts up to ¾ x 4 in., rolled thread, 85-10-5 to 85-10; cut thread, 85-10 to 85-5; larger sizes, 85-10-5 to 85-10; coach screws, 85-10-10 to 85-10; hot pressed nuts, square head, $7.10 to $6.60 off per cwt.; hexagon, $8.10 to $7.60 off per cwt. Structural rivets, ¾ to 1¼ in., 1.45c. to 1.55c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.00c.; boiler rivets, 2.10c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅜ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Wire Products.—The volume of shipments in wire products is in the ascendant and the trade appears to be moving toward its months of maximum activity at a rate which promises a fair comparison with the average year. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.539; wire nails, $1.739; painted barb wire, $1.739; galvanized, $2.139; polished staples, $1.739; galvanized, $2.139, all Chicago.

Cast-Iron Pipe.—At Cincinnati the award of 1400 tons of high pressure pipe will be made to the United States Cast Iron Pipe & Foundry Company, and at Kalamazoo the Lynchburg Foundry Company will supply 400 tons. Prospective lettings for the near future include 4250 tons at Portland, Ore., and several small lots of from 100 to 200 tons at Appleton, Wis., Redford, Mich., and Anna, Ill. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $25.50; 6 to 12 in., $23.50; 16 in. and up, $23, with $1 extra for gas pipe.

Old Material.—The past week has been one of marked dullness in the scrap market. Prices, while they have felt the softening influence of this limited buying, are quotably lower in but few instances. Railroad offerings of scrap include a heavy list from the Pennsylvania Lines West and a list of 4000 tons from the Chicago & Northwestern, which is interesting, particularly because of an item of 400 tons of old iron rails. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$11.50 to $12.00
Old steel rails, rerolling	9.75 to 10.25
Old steel rails, less than 3 ft	10.00 to 10.25
Old carwheels	10.00 to 10.50
Heavy melting steel scrap	9.25 to 9.50
Frogs, switches and guards, cut apart	9.25 to 9.50
Shoveling steel	8.50 to 9.00
Steel axle turnings	7.25 to 7.50

Per Net Ton

Iron angles and splice bars	$11.25 to $11.75
Iron arch bars and transoms	11.25 to 11.75
Steel angle bars	8.25 to 8.50
Iron car axles	13.75 to 14.25
Steel car axles	11.00 to 11.50
No. 1 railroad wrought	8.75 to 9.25
No. 2 railroad wrought	8.25 to 8.75
Cut forge	8.25 to 8.75
Steel knuckles and couplers	8.50 to 8.75
Steel springs	9.00 to 9.50
Locomotive tires, smooth	8.50 to 9.00
Machine shop turnings	5.25 to 5.75
Cast borings	4.75 to 5.25
No. 1 busheling	7.75 to 8.00
No. 2 busheling	6.75 to 7.00
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
Boiler punchings	8.25 to 8.50
No. 1 cast scrap	9.00 to 9.25
Stove plate and light cast scrap	8.25 to 8.50
Grate bars	8.00 to 8.25
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.25 to 7.50
Pipes and flues	6.75 to 7.25

Hickman, Williams & Co., whose Chicago offices have been for many years in the Rookery Building, will remove about February 10 to 1701 McCormick Building, 332 South Michigan boulevard.

Philadelphia

PHILADELPHIA, PA., February 2, 1915.

The brightest features in this market, and they are of sufficient magnitude to inspire much confidence, are the better railroad buying and the busy state of a majority of shipyards on the Atlantic seaboard. One local yard is filled with work for two years to come. Though the buying of rails and miscellaneous maintenance of way equipment cannot be said to be normal, there is decidedly more activity than was the case only a few weeks ago, and it is believed that car buying will be livelier before long and that some of the freight cars to be ordered will be of unusually heavy types. The Maryland Steel Company, within a few hours after the loss of the American-Hawaiian freighter, Washingtonian, received an order for a duplicate ship. In pig iron there has not been much change but a healthier condition is reported among consumers. Some large inquiries for export have been received but it remains to be seen if these will develop into actual business.

Iron Ore.—Arrivals of iron ore at this port in the week ended January 30 were only 4700 tons from Cuba. In the past few days three vessels bringing manganese ore, aggregating approximately 16,000 tons, have arrived, one at New York and two at Baltimore. The vessel which arrived at New York will discharge the ore she carried at Philadelphia.

Pig Iron.—After a survey of the field which they serve, some sellers of pig iron are of the opinion that there is a slight betterment in the general average of

foundry operations, but others say they find no change worthy of comment. With all sellers there exists the usual routine demand for small lots. No large domestic inquiries have appeared but there are some of notable size from abroad, though the latter have not yet resulted in sales. As a rule the week was a quiet one. The largest sales included the taking of 1000 tons of pipe iron by a local pipe foundry; 3000 tons of Lebanon low phosphorus iron by another interest and 600 tons of Virginia iron by a New England manufacturer. The inquiries received have been mostly from lots varying from 100 to 300 tons and for miscellaneous grades. The demand on Virginia makers is lighter, though they shipped more iron in January than they did in December; nevertheless, their stocks at the furnace have continued to increase. Southern iron has been inactive. A few hundred tons of basic has been taken, in part by a manufacturer of tool and special steels, otherwise basic is quiet. Only small lots of low phosphorus have moved. The foreign inquiries include one for 10,000 tons of what may be called a special Bessemer iron. This is but one of several received. Sellers are frank in saying that at the present time they do not see how they can do any business with Europe in view of the difficulties of transportation. They are hopeful, however, that business in this direction will ultimately develop. They believe that Italy, as well as England, will be forced to turn here. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X foundry	$14.25 to $14.50
Eastern Penna. No. 2 plain	14.00 to 14.25
Virginia No. 2 X foundry	15.25
Virginia No. 2 plain	15.00
Gray forge	13.50 to 13.75
Basic	13.50 to 14.00
Standard low phosphorus	20.00 to 21.00

Ferroalloys.—There is a feeling based on advices from abroad that England may soon let down the bars on exports of ferromanganese to this country, otherwise there is no change in the situation. The nominal price for 80 per cent. ferromanganese continues at $68, seaboard. English makers have a large supply which they are anxious to turn into money. The trade has received an inquiry from Australia for 800 tons, but sees no way of responding to it. No change is reported in 50 per cent. ferrosilicon, the price of which remains at $71 to $73, Pittsburgh.

Bars.—Interest in steel bars seems to have lessened. One producer adheres to 1.30c., Philadelphia, for the remainder of this quarter and 1.35c. for the second quarter, but other sellers have not followed and 1.25c., Philadelphia, and 1.30c., respectively, are still the general quotations. Iron bars are quoted at 1.20c., Philadelphia.

Plates.—The several ships which have been ordered lately should give a stimulus to the demand for plates, but it has not yet affected the operations of local mills. A representative maker finds no change in the situation and is still operating at about 50 per cent. of capacity in filling miscellaneous orders. The Pennsylvania Railroad has bought about 1050 tons which it will use for the construction of cars in its own shops. The trade is exceedingly hopeful that this railroad will actively begin the acquisition of new cars. Quotations are unchanged at 1.25c., Philadelphia, for this quarter and 1.30c. for the next.

Steel Rails.—The Boston & Maine Railroad has bought 15,000 tons of steel rails. The Maine Central is in the market for 8500 tons. The Florida East Coast Railroad has purchased 500 tons. It is estimated that in January orders were placed for about 110,000 tons of rails and the feeling is strong that several of the Eastern railroads will soon be heard from.

Structural Material.—About the only good proposition now up in this vicinity is the new office building for the Victor Talking Machine Company, Camden, N. J., which will take about 1250 tons. Mill operations are at a low ebb. J. C. Moyer & Co., iron and steel contractors, Philadelphia, have been awarded a contract by the Navy Department for the conveying machinery and structural material to be used at a coaling station at Guantanamo Bay, Cuba. This company is now completing a contract for the fabricated steel and steel castings to be used at the Colon breakwater of the Panama Canal. Quotations for local delivery are unchanged at 1.25c. for first quarter and 1.30c. for the second.

Sheets.—While the local producer is now running full on an accumulation of orders, conditions are pronounced unsatisfactory because of the backwardness of consumers in specifying against their contracts and there is a tendency on their part to talk of concessions in price. Consequently makers cannot see far ahead. The quotation for No. 10 blue annealed sheets is unchanged at 1.45c., Philadelphia, for desirable lots.

Billets.—In some directions a little betterment in the demand for billets is reported. Export requirements have indirectly led to the purchase of a few hundred tons and a few hundred have been sold also for purely domestic consumption. There is, however, no great or general improvement in the demand and the quotation is unchanged at $21.40 for open-hearth rolling billets, over which forging steel commands a premium of about $4.

Coke.—The market is quiet. Quotations are as follows: Standard Connellsville furnace coke for prompt shipment, $1.55 to $1.60 per net ton at oven; contract furnace coke, $1.75; prompt foundry, $2 to $2.20, and contract foundry at $2.10 to $2.30. Freight rates from the principal producing districts are as follows: Connellsville, $2.06; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—Except for a more hopeful feeling there is little to note in this market. The mills have not arrived at a point where they are interested in scrap. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$10.00 to $10.50
Old steel rails, rerolling	10.50 to 11.00
Low phosphorus heavy melting steel scrap	14.00 to 14.50
Old steel axles	13.50 to 14.00
Old iron axles	17.50 to 18.00
Old iron rails	13.00 to 14.00
Old carwheels	10.50 to 11.00
No. 1 railroad wrought	12.00 to 12.50
Wrought iron pipe	10.00 to 10.50
No. 1 forge-fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 busheling	7.75 to 8.25
Machine shop turnings	8.00 to 8.50
Cast borings	8.00 to 8.50
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.50 to 9.00
Stove plate	8.50 to 9.00
Railroad malleable	9.00 to 9.50

Buffalo

BUFFALO, N. Y., February 1, 1915.

Pig Iron.—The past week has shown considerable improvement. Demand has increased slightly, prices are more strongly held and further gradual improvement is expected. Foundries are taking iron on orders at a better rate than for the past few weeks. Furnace shipments for the month of January aggregated about 75,000 tons, foundry grades, malleable and basic. Prices have stiffened 25c. per ton on small orders. One producer reports a No. 2X foundry order booked at $13.50 and a 500-ton lot of low silicon at $13. Among the week's purchases was 1000 tons of No. 2X by the Enterprise Foundry Company, Auburn, N. Y., which finds its business again normal. We quote as follows, f.o.b. furnace, for first half delivery:

No. 1 foundry	$13.25 to $13.50
No. 2 X foundry	13.00 to 13.25
No. 2 plain	13.00
No. 3 foundry	13.00
Gray forge	12.75 to 13.00
Malleable	13.00 to 13.25
Basic	13.50
Charcoal, regular grades and analysis*	15.75 to 17.00

*The minimum applying only to direct shipments from furnace instead of from storage yards or docks at Buffalo.

Finished Iron and Steel.—One of the independent producing interests announces an advance on bars, straps and plates to 1.20c., Pittsburgh base, for second quarter delivery and to 1.15c. for March delivery, the price for immediate delivery and through February remaining at 1.10c. It is reported this advance will be

made effective this week by the other producing interests. Demand shows betterment. Orders for spring shipment of wire seem to be on the increase with fair specifications against sheet and tin plate contracts. Bids go in February 2 for 110 tons of steel for the Pennsylvania Feldspar Company, at Barnard, N. Y. The Lackawanna Bridge Company has several orders for railroad bridges, among which are included two for the Erie and one for the Lehigh Valley. It is stated the Buffalo Structural Steel Company has 500 tons for the Eastern Grain, Mill & Elevator Corporation and will furnish 100 tons for the George Meyer Malting Company, Buffalo.

Old Material.—The week has shown no improvement in demand and sales continue to be of small volume, although a moderate amount of business is being done in practically the entire list. Prices are inclined to be softer and dealers prefer to hold stock on hand for a betterment. The schedule is not quotably changed and we continue last week's list of dealers' asking prices, which is as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$10.25 to $10.75
Low phosphorus steel	12.50 to 13.00
No. 1 railroad wrought scrap	10.00 to 10.50
No. 1 railroad and machinery cast	10.50 to 11.00
Old steel axles	12.00 to 12.50
Old iron axles	16.00 to 16.50
Old carwheels	10.00 to 10.50
Railroad malleable	9.50 to 10.00
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	8.50 to 9.00
Clean cast borings	5.75 to 6.50
Old iron rails	11.00 to 11.50
Locomotive grate bars	9.00 to 9.50
Stove plate (net ton)	8.25 to 8.75
Wrought pipe	6.50 to 7.00
Bundled sheet scrap	7.00 to 7.50
No. 1 busheling scrap	7.50 to 8.00
No. 2 busheling scrap	5.25 to 5.75
Bundled tin scrap	10.00

Cleveland

CLEVELAND, OHIO, February 2, 1915.

Iron Ore.—Stocks of ore in furnace yards are reported to be unusually large in spite of the light shipments of Lake Superior ore last season. Not only is this true of the Central Western furnaces but also of the Eastern furnaces that have large stocks of foreign ore in their yards. With the size of stocks on hand, ore firms do not look for a buying movement until later than usual in the season. We repeat 1914 prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—The market shows little life, sales being limited almost entirely to small lots of foundry iron for prompt shipment, and there is little new inquiry. A central Indiana foundry is reported to have purchased 2500 tons of foundry iron from a Toledo furnace for delivery during the second quarter and last half, and 2000 tons of Southern foundry iron for the same delivery. A central Ohio implement manufacturer is in the market for 400 tons No. 2 Northern foundry iron for the second quarter. Prices on Northern iron are unchanged at $12.75 to $13, Cleveland, for No. 2, for outside shipment and $13.50 delivered Cleveland. Some small lot sales of Southern foundry iron are reported at $9.75 Birmingham for No. 2. Quotations on this iron still range from $9.50 to $10 Birmingham. The improvement in melt reported last week continues. A few jobbing foundries that make a specialty of automobile work are crowded to capacity and other jobbing foundries are melting more iron than a few weeks ago. We quote, delivered Cleveland, as follows:

Bessemer	$14.55
Basic	13.45
Northern No. 2 foundry	13.50
Southern No. 2 foundry	$13.50 to 14.00
Gray forge	13.00
Jackson Co. silvery, 8 per cent. silicon	16.62 to 17.12
Standard low phos., furnace	19.75 to 20.00

Coke.—There is some demand for small lots of foundry coke from consumers not under contract, but little inquiry for contracts. A Cleveland foundry has contracted for 60 cars of Virginia coke at $2.40. Furnace coke is inactive. We quote standard Connellsville furnace coke at $1.50 to $1.60 per net ton at oven, and standard foundry coke for prompt shipment and contracts at $2.15 to $2.40. However, some brands are selling as high as $2.50.

Finished Iron and Steel.—Specifications on contracts are coming out in a fair volume and consumption by manufacturers shows an improvement. Some of the mill agencies report a considerable increase in the volume of orders during January as compared with December, and the total tonnage booked during the month is almost equal to that booked during December. This is regarded as a satisfactory showing in view of the fact that the advance in prices a month ago brought out considerable tonnage late in December. The Carnegie Steel Company has advanced its price on steel bars, plates and structural material to 1.15c. for March and 1.20c. for the second quarter, following a similar advance in bars and plates made by the Republic Iron & Steel Company. Other independent steel companies are expected to make similar advances. In spite of the upward tendency of the market, plates can still be had from some mills at 1.05c., Pittsburgh, for desirable orders, but steel bars and structural material are firm at 1.10c. An encouraging feature in the market is that warehouse business during January was the best in three months. In structural lines the Republic Structural Iron Works Company has taken 200 tons for an addition to the plant of the Chandler Motor Car Company, Cleveland, and the Riter-Conley Mfg. Company has taken the Jewish Hospital in Cleveland, requiring 450 tons. Bids for the Clark avenue bridge, Cleveland, which will require 7500 tons, will be taken February 23. It is announced that the structural steel requirements for the Pennsylvania Lines East and West during the year, for bridges, will aggregate 22,000 tons. This is in addition to the 20,000 tons required for track elevation in Indianapolis, for which bids have been received. Owing to the high price of spelter some sheet mills have withdrawn all quotations on galvanized sheets; a local mill has advanced its price $1 a ton on blue annealed to 1.35c., Pittsburgh, for No. 10. We quote sheets at 2.90c. to 3c., Ohio mill, for No. 28 galvanized, 1.80c. for No. 28 black and 1.30c. to 1.35c. for No. 10 blue annealed. The Otis Steel Company has shut down its Riverside works, making light plates and heavy sheets, until the demand improves. Bar iron is inactive, with 1.15c., Cleveland mill, as the ruling price for local delivery. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Old Material.—The market is dull and prices are weak. None of the local consumers are in the market for any grade of scrap. Weather conditions have prevented the moving of material except turnings during the past few days. Heavy melting steel prices have declined about 25c. a ton in Cleveland, and prices on several other grades are 25c. a ton or more lower. Iron and steel car axles are about 50c. a ton higher. Heavy steel scrap is quoted at $10.75 to $11 in the Valley. The two Pennsylvania scrap lists are out, one of which will be closed to-morrow and one Friday. The B. & O. Railroad Company will receive bids on its list February 10. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Old steel rails, rerolling	$11.00 to $11.75
Old iron rails	12.00
Steel car axles	13.25 to 13.75
Heavy melting steel	9.50 to 9.75
Old carwheels	10.00 to 10.50
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	8.00 to 8.50
Railroad malleable	10.00 to 10.25
Light bundled sheet scrap	8.00 to 8.50

Per Net Ton

Iron car axles	$16.50 to $17.00
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings	5.25 to 5.50
Steel axle turnings	6.00 to 6.25
No. 1 busheling new	8.50 to 8.75
No. 1 busheling old	8.25 to 8.50
No. 1 railroad wrought	9.25 to 9.75
No. 1 cast	10.00 to 10.50
Stove plate	7.50 to 7.75

Bolts, Nuts and Rivets.—Bolt makers are getting a fair volume of orders and an improvement is noted in the demand from railroads. Regular discounts are being better maintained, but there is still considerable shading on carriage and machine nuts. Rivet prices are firmer, the usual quotation being 1.45c., Pittsburgh, for structural and 1.55c. for boiler for carload lots, with an advance of $1 a ton for small lots. Regular discounts are as follows: Common carriage bolts ⅝ x 6 in., small-

er or shorter, rolled thread, 80 and 10 and 5 per cent.; cut thread, 80 and 10 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h.p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 80 and 10 and 10 per cent.; cut thread, 80 and 10 and 5 per cent.; larger or longer, 80 per cent.; coach and lag screws, 85 and 5 per cent.; square h.p. nuts, blank or tapped, $6.50 off; hexagon h.p. nuts, blank or tapped, $7.40 off; c.p.c. and t. square nuts, blank or tapped, $6.20 off; hexagon, ⅝ in. and larger, $7.50 off; 9/16 in. and smaller, $8 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 10 per cent.; 9/16 in. and smaller, 85, 10, 10 and 10 per cent.

Cincinnati

CINCINNATI, OHIO, February 3, 1915.—(*By Wire.*)

Pig Iron.—Orders for approximately 4000 tons of foundry iron were placed by an Indiana buyer last week, with shipment to extend well into the last half. This tonnage was distributed among several makers and was about equally divided between Northern and Southern brands. It is understood that the price was close to the present prompt delivery quotations. Furnaces in four different producing centers bid on this particular lot of iron, and figures said to have been quoted indicate that they were nearly all willing to take on orders at present prices for last half shipment, when deliveries commenced during the second quarter. The local and nearby inquiry for foundry iron continues light, but most foundries are taking iron due on old contracts, and apparently they are not piling any in their yards but are melting it as fast as received. This applies especially to jobbing foundries making a specialty of machine-tool castings. Although a few sellers and buyers have been holding diplomatic negotiations as to a last half supply of iron, the rank and file of consumers do not care to take hold just now, nor are the furnaces willing to formally open their books for that delivery. An inquiry for about 6000 tons of basic, for shipment in the next six months, has been issued by a nearby rolling mill. Several additional sales of Ohio silvery iron are reported, and prices are firmer. Malleable is very quiet. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	$12.90 to $13.40
Southern coke, No. 2 f'dry and 2 soft.	12.40 to 12.90
Southern coke, No. 3 foundry	11.90 to 12.40
Southern No. 4 foundry	11.40 to 11.90
Southern gray forge	10.90 to 11.40
Ohio silvery, 8 per cent. silicon	16.26 to 16.51
Southern Ohio coke, No. 1	15.01 to 15.51
Southern Ohio coke, No. 2	14.01 to 14.51
Southern Ohio coke, No. 3	13.76 to 14.01
Southern Ohio malleable Bessemer	14.26
Basic, Northern	14.26
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	26.90 to 27.40

(*By Mail*)

Coke.—The new demand for both furnace and foundry coke is light, but this is offset, to a small extent, in the better reports as to specifications on old contracts. The jobbing foundries, as a rule, are taking all that is due them. Connellsville grades are still weak, and $1.50 to $1.65 about represents the market on 48-hr. coke, the last named figure representing the contract price. Foundry coke is quoted around $2 to $2.25 per net ton at oven.

Finished Material.—At this writing the quotation on No. 28 galvanized sheets is 3.15c. f.o.b. Cincinnati, or Newport, Ky., and the mills would not accept any business at this figure except for prompt shipment. If spelter advances continue to be registered, galvanized sheets will be quoted higher before the week is up. Black sheets are also stronger and are quoted around 2.05c. to 2.10c., Cincinnati, and Newport, for No. 28, bnt it is probable that they could be bought in other producing centers at lower figures. There is very little business in steel bars or structural shapes and warehouse prices are unchanged at 1.70c. Railroad track material is slow.

Old Material.—Although the demand is poor and there are large offerings out, prices have not slumped any lately, indicating that they had reached bottom. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton		
Bundled sheet scrap	$6.25 to	$6.75
Old iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	19.75 to	20.25
Rerolling steel rails	9.75 to	10.25
Melting steel rails	8.75 to	9.25
Heavy melting steel scrap	8.50 to	9.00
Per Net Ton		
No. 1 railroad wrought	$7.50 to	$8.00
Cast borings	4.00 to	4.50
Steel turnings	4.00 to	4.50
Railroad cast scrap	9.25 to	9.75
No. 1 machinery cast scrap	9.75 to	10.25
Burnt scrap	6.00 to	6.50
Old iron axles	13.50 to	14.00
Locomotive tires (smooth inside)	8.75 to	9.25
Pipes and flues	5.50 to	6.00
Malleable and steel scrap	6.75 to	7.25
Railroad tank and sheet scrap	4.50 to	5.00

Birmingham

BIRMINGHAM, ALA., February 1, 1915.

Pig Iron.—There has been very little change. New features are reported sales for export and some shipments to Europe. The average basis of transactions ranges between $9.50 and $9.75, except for special irons and second quarter delivery by some concerns. The sales are mostly in small lots. Carload lots go at $9.75. The total volume of business is not large. Pipe founders are reported as about to enter the market again for a respectable tonnage owing to the receipt of a number of sizable orders for pipe. Stocks have not apparently gone far below 500,000 tons of all kinds in Alabama furnace yards, and special efforts to induce Southern foundries to accept the iron ordered have met with only partial success. The rail mill of the Tennessee Company went on full turn again on Monday morning, and it is understood that assurance of a continuation of such operations is held out. The local plant of the American Steel & Wire Company, which receives its billets from the Tennessee Company, also resumed Monday on a 65 to 75 per cent. gait. Altogether the prospect for the consumption of basic iron on a large scale for some time appears good. Iron makers are still inclined to maintain the make with the belief that foundry consumption in the South will soon increase materially. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$10.00 to $10.25
No. 2 foundry and soft	9.50 to 9.75
No. 3 foundry	9.00 to 9.25
No. 4 foundry	8.75 to 9.00
Gray forge	8.50 to 8.75
Basic	9.50 to 10.00
Charcoal	22.50 to 23.00

Cast-Iron Pipe.—The water and gas pipe shops of the Birmingham district have been successful bidders on a number of contracts and the inclination is to increase the output. Sanitary pipe shops have not yet taken a stride forward, but expect to do so in the near future. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $20; 6-in. and upward, $18, with $1 added for gas pipe.

Coal and Coke.—Coal is dull. Coke is demanding fair prices and the make is taken care of. An increase in the use of by-product coke is reported. There have been several shipments to the far West. We quote, per net ton, f.o.b. oven, as follows: Furnace, $2.75 to $2.90; foundry, $3.20 to $3.40, with the very best grades fetching still higher prices.

Old Material.—The scrap market is picking up to a slight extent, owing to an increased demand by steel makers. We quote, per gross ton, f.o.b. dealer's yards, as follows:

Old iron axles	$13.00 to $13.50
Old steel axles	12.50 to 13.00
Old iron rails	12.00 to 12.50
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.00 to 7.50
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	8.50 to 9.00
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., February 1, 1915.

Pig **Iron.**—Transactions were for pressing needs, with no sales of large quantities. Demand, however, is more widely spread and buying for the next 60 days is expected to be of the hand-to-mouth order, with progress steadily upward.

Coke.—No movement is reported except in carload lots and on requisition under existing contracts. Prices are unchanged from the generally quoted Connellsville basis, with small lots commanding a slight premium.

Finished **Iron and Steel.**—An increase in volume is noted, but it comes from an increased and more widely spread number of orders, with no great change in individual size. All buying seems to be for immediate demand and few contracts are being placed. Buyers are taking reasonably well to the advance to 1.15c. Pittsburgh, for March, and 1.20c. for second quarter delivery. Railroads are buying more material. Two good sized projects being figured on for decision late in the month are an 8000-ton standard rail contract for a proposed Kansas road and 10,000 tons of structural steel and considerable reinforcing material for a bridge over the Columbia River for the Pacific Inter-State Highway Bridge Company. Stock out of warehouse is increasingly active with an expected advance in galvanized sheets. We quote as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plate, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, cold rolled, 2.55c.; No. 28 galvanized sheets, black sheet gauge, 3.55c.

Old **Material.**—Scrap is a little softer, but dealers have not reduced prices. There is some demand from the rolling mills and there is also request for machine cast scrap. Weather conditions have had something to do with the market status. Lists out include 700 tons from the Missouri, Kansas & Texas, 1400 tons from the Missouri Pacific, 500 tons from the George W. Jennings Company, and 8000 tons from the Baltimore & Ohio. These close this week. We quote dealers' prices, f.o.b. St. Louis, as follows:

	Per Gross Ton	
Old iron rails	$10.00 to	$10.25
Old steel rails, re-rolling	10.25 to	10.50
Old steel rails, less than 3 feet	11.50 to	12.00
Relaying rails, standard section, subject to inspection	21.00 to	23.00
Old carwheels	10.25 to	10.50
No. 1 railroad heavy melting steel scrap	9.50 to	9.75
Shoveling steel	8.75 to	9.00
Frogs, switches and guards cut apart	9.75 to	10.00
Bundled sheet scrap	6.00 to	6.25
	Per Net Ton	
Iron angle bars	$10.75 to	$11.00
Steel angle bars	9.00 to	9.25
Iron car axles	15.00 to	15.50
Steel car axles	10.75 to	11.00
Wrought arch bars and transoms	11.25 to	11.50
No. 1 railroad wrought	8.25 to	8.50
No. 2 railroad wrought	8.00 to	8.25
Railroad springs	8.75 to	9.00
Steel couplers and knuckles	9.00 to	9.25
Locomotive tires, 42" and over, smooth inside	9.00 to	9.25
No. 1 dealers' forge	7.50 to	7.75
Mixed borings	5.25 to	5.50
No. 1 busheling	7.75 to	8.00
No. 1 boilers, cut to sheets and rings	6.25 to	6.50
No. 1 railroad cast scrap	9.50 to	10.00
Stove plate and light cast scrap	8.00 to	8.25
Railroad malleable	7.25 to	7.50
Agricultural malleable	6.75 to	7.00
Pipes and flues	6.25 to	6.50
Railroad sheet and tank scrap	6.25 to	6.50
Railroad grate bars	7.50 to	7.75
Machine shop turnings	5.75 to	6.00

Boston

BOSTON, MASS., February 2, 1915.

Old **Material.**—Conditions in the New England scrap market have not changed. The demand for local material has not increased, but opinion remains strong that business is due for better things. The strength of the Pittsburgh market is still unfelt here, except sentimentally. Prices have not changed. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel	$8.25 to	$8.50
Low phosphorus steel	13.75 to	14.75
Old steel axles	12.75 to	13.25
Old iron axles	20.25 to	20.75
Mixed shafting	12.00 to	12.25
No. 1 steel wrought and soft steel	8.25 to	8.75
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	7.00 to	7.50
Cotton ties (bundled)	5.25 to	5.75
No. 2 light	3.25 to	3.75
Wrought turnings	5.00 to	5.50
Cast borings	5.00 to	5.25
Malleable	7.50 to	7.75
Stove plate	7.00 to	7.50
Grate bars	5.25 to	5.50
Machinery cast (price to consumers)	11.25 to	11.50

San Francisco

SAN FRANCISCO, CAL., January 26, 1915.

The jobbing trade remains quiet. Some leading merchants express little confidence in the prospect of appreciably higher mill prices, or of any large consuming demand in this vicinity, but on the whole a better feeling prevails. Advancing water freight rates are an inducement to larger buying for prompt shipment; stocks are being replenished more liberally, and there is more disposition to contract for extended delivery, though purchases are still being made with caution. Local resale prices have not yet advanced, but the 40c. rate on Panama Canal shipments, to take effect February 15, is expected to bring a change. Increasing difficulty is experienced in getting space for shipments by that route.

Bars.—Little new business in reinforcing bars is appearing, but there is more demand for soft steel bars, mainly in view of the prospect of higher prices following the rate advance. Local mills are now active competitors in practically all lines of bars. Since the local Judson plant has changed from a wrought-iron to an open-hearth steel mill, rolling iron only on special orders, and similar changes are being made by other Pacific coast mills, iron bars are almost eliminated from the market, and are held at a slight premium over steel, as compared with the former differential in favor of iron.

Structural Material.—Bids will be taken February 23 for the Columbia River interstate bridge construction, requiring about 9500 tons, and figures will be taken shortly for nine steel towers for the Government, requiring about 300 tons each, to be erected at San Diego and in the Hawaiian and Philippine Islands. No local inquiries have appeared, though preliminary work is being done for the city library, and plans have been started for a four-story steel and stone building at the University of California. The McClintic-Marshall Company has taken a 550-ton job for the Santa Fé Railroad at Los Angeles and a small bridge at San Diego. Other recent fabricating contracts are of an insignificant nature.

Plates.—While small boiler shops, etc., are ordering but little, there is more buying by merchants whose stocks have been held down and are now being built up to normal. Specifications are also coming out more freely from manufacturers, who are well occupied with tank and pipe work.

Sheets.—Heavy blue annealed and hard red sheets are much firmer, and light black and galvanized now appear to be stiffening a little, with increasing reluctance to accept business at current prices except for prompt shipment. Merchants are accordingly taking more interest, and the larger manufacturers are also making provision for spring requirements, anticipating an active season in irrigation specialties.

Wrought Pipe.—A slight but fairly general increase of buying is noted, as stocks in most quarters are light, and advancing freight rates indicate the advisability of putting in larger supplies. As far as can be learned, however, no heavy stocks have been ordered. Jobbing business in the country is reported a little better, but the local trade remains quiet, and nothing new is reported in the oil fields.

Cast-Iron Pipe.—The city of Los Angeles is taking bids this week for 700 tons of 4, 6 and 8 in. pipe, and Pasadena is taking bids on 54 tons. San Diego will take bids February 1 for a small lot of 4 and 6 in. An advanced freight rate of 45c. per 100 lb. is announced

on shipments by the Panama Canal, and service from the Gulf ports has been stopped.

Pig Iron.—The interruption of steamer service from Gulf ports has put a serious handicap on shipments from the Southern furnaces for the present. The local market, however, is not in a condition to absorb any large tonnage from that quarter. The bulk of the scattering arrivals from all sources is coming in unsold and going into stock, as the foundry business has been exceptionally dull and most melters are well supplied. There is some pressure to reduce the spot accumulations, and prices are irregular.

Coke.—Stocks on hand are rather burdensome and are not moving to any great extent, though some small sales are being made at about $12.50 per net ton, and holders hope to realize better prices later. A little English coke is being loaded, and is quoted for current or spring loading at about $11 to $12 per gross ton.

Old Material.—Under present foundry conditions the movement of cast-iron scrap is confined to narrow limits, though most offerings are still held at about $14 to $16 per net ton. There is little demand in other lines, local steel manufacturers having provided for their requirements for some time to come. The change of several bar mills from a wrought-iron to an open-hearth steel basis has materially altered the scrap situation, as quite a heavy tonnage of wrought-iron and soft steel scrap which has been held for some time at rather high prices will have to be disposed of on a melting scrap basis. Accordingly, though requirements in the latter line are larger than in former years, and will probably increase still further, prices have not advanced. Holders, in fact, show considerable anxiety to sell, and desirable lots of melting scrap are offered at about $7 per gross ton.

New York

NEW YORK, February 3, 1915.

Pig Iron.—The local market continues extremely quiet. One Boston foundry interest has been inquiring for 2600 tons of foundry iron for first half, but the closing of the entire amount at this time is problematic. A considerable purchase was made at Trenton last week, in which Southern 2 per cent. silicon iron figured in part, the delivered price for the latter being somewhat under $14. Central Pennsylvania iron is still quoted in New England on a basis figuring back to $13 at furnace for No. 2 X. Buffalo irons are generally held at $13 at furnace for No. 2 X, but with little or none sold for Eastern shipment at that figure. Malleable pig iron has recently been quoted around $12.50 at Buffalo furnace. In Virginia, with three furnaces in blast and Oriskany soon to go in, $12.50 at furnace is the general quotation for No. 2 X. Northern iron for tidewater delivery is quoted as follows: No. 1 foundry, $14.45 to $14.95; No. 2 X, $14.20 to $14.45; No. 2 plain, $13.95 to $14.20. Southern iron may be quoted at $14.50 for No. 1 and $14 to $14.25 for No. 2.

Ferroalloys.—A little more interest is detected among consumers of ferromanganese in this market and there is no doubt that if the British embargo were lifted the present total of about 2000 tons of inquiries before the trade would decidedly increase and the buying become active. Recent conditions in British shipping are tending to accentuate the unrest here. Prospects of a clearing up of the ferromanganese situation on the other side are reported as brighter and the hope is intensified that a solution is nearer, through the giving of guarantees against steel exports to Great Britain's enemies. Italy and Japan are inquiring for about 1500 tons but no sales are reported. Sales by domestic producers, though rumored, are not definite. Spiegeleisen is fairly active, with some foreign inquiries appearing. Rumors of sales of spot ferromanganese are heard at $70 to $75, seaboard, but not confirmed. Quotations still rule at $68, seaboard, when the material is available. Ferrosilicon, 50 per cent., is still obtainable at $71 to $73, Pittsburgh.

Finished Iron and Steel.—Experiences are not identical that improvement has been shown, so that it is clear that business has merely held its own. The large steel companies have all given orders that new business in March in bars, plates and shapes must be taken at the basis of 1.15c., Pittsburgh, and for the second quarter at 1.20c., Pittsburgh. Doubts are expressed as to how well these prices will hold in the event that large offerings develop, particularly where Eastern mills will be located advantageously as regards freight charges. Reports are quite unanimous that there is a better outlook in local building operations, indicated for example in increased demand for wrought pipe and in advance items of projected buildings. One matter for encouragement is that railroad car builders have about 4300 cars under active consideration, against 2900 last week and 1000 placed in the interim. Exporting is receiving a decided check in the inability to secure bottoms and there are cases where payments for materials at seaboard are held up because contract stipulations specify the consignment free aboard ship. One of the large projects calling for structural material, involving 9500 tons, is the Columbia River Interstate bridge, Portland, Ore., and the Newark market project, 1600 tons, has again come into the market; an office building for the Victor Talking Machine Company, Camden, N. J., 1250 tons, is being figured; a large building for a printing establishment, Eighth avenue and Thirty-third street, is under consideration; Bartlett, Hayward & Co., Baltimore, are to build a 5,000,000 cu. ft. gas holder at Lynn, Mass.; W. J. Wilgus is consulting engineer for the St. John River bridge from Van Buren, Me., to New Brunswick, and the Standard Oil Company is reported in the market for 400 tons for a building in Long Island City. The awards of the week include 2000 tons for the Arnold Constable store to the Levering & Garrigues Company; 350 tons for a department store, Springfield, Mass., to the Walsh Steam Boiler Works and 325 tons for an apartment on West Fifteenth street, to the Hay Foundry & Iron Works. For railroad cars, the Santa Fé has entered the market for 700 box cars and the Burlington for 1700 and the Illinois Central has closed for 1000 refrigerator cars. We quote mill shipments of steel bars, shapes and plates at 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York, and refined iron bars at 1.20c. to 1.25c., New York. From store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plates and shapes at 1.85c. to 1.90c.

Cast-Iron Pipe.—No new municipal lettings of importance are in sight in this territory. Considerable business, however, is still being done with private buyers. Prices on this class of trade are a little stronger, as so many of the pipe founders are now well supplied with work. Some of the most active seekers for business have recently been naming slightly higher prices. Carload lots of 6-in. are quoted at $20 to $20.50 per net ton, tidewater.

Old Material.—Some demand appears to exist for heavy melting steel scrap, mainly from dealers who either have contracts to fill or are disposed to take the chance of a better market in the near future, and are, therefore, accumulating some stock. Foundries are also more disposed to take more cast scrap and the movement of this class of material is improving. Holders of old material are less willing to part with their stock at current prices, and the tendency to lower prices is not so pronounced as a short time ago. Dealers quote as follows, per gross ton, New York:

Old girder and T rails for melting	$8.00 to $8.25
Heavy melting steel scrap	8.00 to 8.25
Relaying rails	19.00 to 19.50
Rerolling rails (nominal)	8.25 to 8.50
Iron car axles	15.00 to 15.25
Steel car axles	11.25 to 11.75
No. 1 railroad wrought	9.75 to 10.25
Wrought-iron track scrap	9.25 to 9.75
No. 1 yard wrought, long	9.25 to 9.75
No. 1 yard wrought, short	8.25 to 8.50
Light iron	3.50 to 4.00
Cast borings	5.75 to 6.25
Wrought turnings	5.75 to 6.25
Wrought pipe	7.50 to 7.75
Carwheels	9.00 to 9.25
No. 1 heavy cast, broken up	10.25 to 10.50
Stove plate	8.00 to 8.25
Locomotive grate bars	7.00 to 7.50
Malleable cast	7.00 to 7.50

A new tin mill is being installed at the plant of the Reeves Mfg. Company, Canal Dover, Ohio. This will make a total of seven mills in the plant, which up to the present time had but one tin mill.

British Steel Prices Still Rising

Tin Plate and Bars Conspicuous—Labor Getting Scarcer—American Bars Sold

(*By Cable*)

LONDON, ENGLAND, February 3, 1915.

Pig iron is rather easier and less active as regards warrants, but there is a steady consumers' business doing. The labor position in the coal trade is somewhat threatening, while the congestion on railroads and in shipping is quite unrelieved. Active furnaces in the three principal districts number 166 against 165 a year ago. Stocks of pig iron in Connal's stores are 118,257 tons against 116,125 tons last week.

Steel has a buoyant tone and looks like going dearer. Labor is everywhere insufficient and steadily getting scarcer. The tin-plate position has slightly improved in the granting of some export permits, but the advance arises mainly from increased costs of raw material. American round steel bars have been sold at £7 8s. 6d. ($36.13), c.i.f., Glasgow. We quote as follows:

Tin plates, coke 14x20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 6d. to 14s. 9d. ($3.52 to $3.58), against 14s. ($3.40) last week and 13s. 3d. ($3.22) two weeks ago.

Cleveland pig iron warrants, 56s. 8d. ($13.78) against 57s. 8d. ($14.01) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 57s. ($13.86), against 58s. ($14.09) last week.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s. ($47.44), against £9 10s. ($46.22) last week and £9 ($43.79) two weeks ago.

Steel ship plates, Scotch, delivered local yards, £8 10s. ($41.36), against £8 ($38.93) last week.

Steel rails, export, f.o.b. works port, £7 ($34.06).

Hematite pig iron, f.o.b. Tees, 95s. to 100s., nominal, ($23.09 to $24.30).

Sheet bars (Welsh), delivered at works in Swansea Valley £6 ($29.20), against £5 10s. ($26.76) last week.

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £8 ($38.93).

Steel bars, export, f.o.b. Clyde, £8 5s. ($40.14), against £7 15s. ($37.70) last week.

Almost a Famine in Hematite—Ore Situation Serious—Shipping Congestion Worse

(*By Mail*)

LONDON, January 21, 1915.—The pig-iron markets have been in a state of high pressure this week and prices have been soaring, especially for hematite, of which there is almost a famine with consumers most anxious as to the future on account of the perilous ore position. The difficulty as regards ore does not merely affect hematite, however, for the position of local ore and limestone supplies on the northeast coast contains much to make consumers anxious, and prices of foundry descriptions of metal are very stiff, though the extreme figures touched lately have not been altogether supported. Some reaction from the extremes, however, may be expected. At present there is a good deal of difficulty in keeping furnaces running, and a considerable number of the stacks are only blowing at part pressure. As for hematite, as much as 90s. ($21.90) per ton has been paid for east coast supplies, and even at this figure there is no inclination on the part of producers to contract ahead. That still higher figures will be seen is the steady conviction of the trade, for there is not the smallest indication of the ore situation improving. So long as the present congestion of shipping endures, so long the freight position must remain as it is. The ship owner has now the world at his mercy.

Japan is trying in a hurry to buy west coast special hematite, but without success, for the furnaces will not sell, and only name 100s. ($24.33) per ton as an indication of the market as they view it. The prices of steel are booming, and it is rather a difficult matter to keep track of what is being quoted from day to day.

SHIPPING CONGESTION SERIOUS

It is the hematite position which is giving the steel makers the "shivers," for they can plainly see that unless there is some waking up to the congestion at the ports here, we shall be in a condition closely bordering upon a blockade. There are tens of thousands of tons of material which have been lying at the docks and in the rivers waiting to be discharged, but our authorities go sleepily on oblivious to anything unusual being afoot. It would not be surprising if some of our port authorities had not yet heard that there was a war on somewhere. This is the attitude taken, at all events, when merchants plead for some attention to their pressing needs. Food ships are left lying for weeks, and one merchant told me to-day that he had barges at a big Atlantic liner which got in here on Christmas and that they were still waiting for the freight to be put into them. Until the authorities wake up to the fact that trade is clogged and cannot right itself by persistence in a supine policy, it is hopeless to look for relief.

There seems to have been some semi-finished steel sold here by the Dominion Iron & Steel Company, Sydney, Nova Scotia, but no details are known. The steel makers are busy in all directions and the shortage of labor becomes more and more acute. In the Clyde shipyards the men are actually being supplied with war badges inscribed "On War Service," with a view to retaining their services in the shipyards. It is difficult to hold men back from the camps, and the scarcity of labor arising from this is creating another and a very difficult problem.

I have already cabled you that the new steel works of the Broken Hill Proprietary Company, at Newcastle, N. S. W., have come into the market as sellers of rails, and that they have booked a couple of orders for Australia. This is a start. It is not likely that there will be any heavy placing of orders with this company until it is ascertained beyond doubt that it is in a position to deal effectively and promptly with orders. Rails can be made there doubtless, but a new plant very often wants a good deal of gentle handling in the early stages.

Metal Market

NEW YORK, February 3, 1915

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
Jan.	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
27	14.75	14.50	35.30	3.70	3.52½	7.50	7.35
28	14.75	14.50	35.75	3.80	3.62½	7.60	7.45
29	14.87½	14.62½	37.12½	3.80	3.62½	7.70	7.55
30	14.87½	14.62½	.....	3.80	3.62½	7.70	7.55
Feb.							
1	15.00	14.75	37.87½	3.80	3.62½	7.75	7.60
2	15.00	14.75	37.80	3.80	3.62½	8.00	7.85

Copper is higher and Lake is practically unobtainable. Tin has advanced with flurries of activity. Lead is 10 points higher and a big demand has been appeased. The upward movement of spelter continues under a heavy demand from the brass mills. Antimony is unchanged.

New York

Copper.—Interest in copper is almost entirely centered in Lake, some brands of which are unobtainable because the producers have sold out, while others are either sold up or are withholding their product from the market, though the latter seems improbable. Many sellers will consider contracts to deliver only in May and beyond. As previously said, nearly all of this metal is directly or indirectly being consumed in the manufacture of munitions of war. Lake is nominally quoted at 15c. Electrolytic is sympathetically higher at 14.75c., and now that exports have subsided for the time being it is probable that this price might be shaded. The copper wire mills are admittedly not busy and the call for the ordinary products into which copper enters is light.

Copper Averages.—The average price of Lake cop-

per for the month of January, based on daily quotations in *The Iron Age*, was 14.01½c. and electrolytic, 13.80½c.

Tin.—Almost every day of the week presented unusual features, one of which was the wide range of prices which prevailed. The market opened dull on January 27 at 35.60c. and closed at 35c. At about this time London houses indicated a willingness to buy in this market providing bargains could be had and some business resulted. This aroused the regular buyers and January 28 there were signs of improvement, the quotation that day being 35.75c. On January 29 prices ranged from 37c. to 37.25c. February 1 a large business was done, at least 300 tons changing hands, the deliveries ranging all the way from spot to June. The lowest price of spot on that day was 37.30c. and the market closed at 38.37½c. London was still a buyer on that day. Yesterday the market became dull again and there were unusual variations in prices. For 25-ton lots the quotation was 37.75c. and for 5-ton lots, 37.87½c. There was more desire to sell yesterday, but buyers were not so much in evidence. Conditions in the port of London are largely responsible for the stronger market, as the freight congestion there is growing worse. At the same time tin-plate makers in South Wales and consumers in the allied and neutral countries have bought freely. The Dutch government is understood to be holding between 5000 and 6000 tons of Banca tin, though some of this has lately appeared in New York. The domestic deliveries in January amounted to 2300 tons, against 3600 tons in the same time last year. In stock, including on dock and landing, January 31, was 1171 tons. The arrivals this month total 875 tons and there is 4285 tons afloat.

Lead.—The development of a heavy demand caused the American Smelting & Refining Company to advance its price January 28 to 3.80c., New York. Just prior to the advance there was a rush of orders from abroad and from domestic consumers and dealers. One foreign inquiry which hung over the market was especially large. All told, a business running into thousands of tons was done and when the large interest raised its price $2 a ton the independents followed at once. The market is now easier. The St. Louis price is 3.62½c.

Spelter.—The nominal price for prime Western spelter is now about 8c., New York, and 7.85c., St. Louis. Brass mill spelter is nominally 10c. and extra choice grades run up to 16c. The brass mills which are busy on war materials have continued to absorb large quantities, and there also has been a heavy export demand. A steamer which sailed for Vladivostock January 28 carried 1950 tons, which was a record shipment. In view of the conditions those who have stocks are holding them tight.

Antimony.—The market has changed but slightly. Domestic business is very quiet, but a stir is caused occasionally by an inquiry from France or Russia. No metal is now coming from Great Britain, and that which is most easily obtainable here is Chinese. Quotations are 18c. to 19c. for Cookson's, 17c. to 18c. for Hallett's and 16c. to 17c. for other brands.

Old Metals.—The market is firm. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	13.00 to 13.50
Copper, heavy and wire	12.50 to 13.00
Copper, light and bottoms	11.50 to 11.75
Brass, heavy	9.00 to 9.25
Brass, light	7.50 to 7.75
Heavy machine composition	11.50 to 11.75
Clean brass turnings	8.75 to 9.00
Composition turnings	9.75 to 10.00
Lead, heavy	3.45
Lead, tea	3.20
Zinc, scrap	5.50

Chicago

FEBRUARY 1.—Spelter quotations have now attained to new high records and, although there is practically no buying, quotations of 7.75c., Chicago, are authoritatively reported. The entire market shows the influence of the European situation and prices for all metals are decidedly higher. There is practically no Cookson's antimony to be had and the prospect is for a complete disappearance of this grade from the market. Scrap metals are following the upward trend of the new metal market. We have revised our prices and quote as follows: Casting copper, 14.50c. to 14.75c.; Lake copper, 14.75c. to 15c., for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 38.25c.; small lots, 41.25c.; lead, desilverized, 3.75c., and corroding, 4c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.75c.; sheet zinc, 10.50c.; Cookson's antimony, 18c. to 20c., for cask lots; other grades, 15c. to 16c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11.75c.; copper bottoms, 9.75c.; copper clips, 11.25c.; red brass, 10.75c.; yellow brass, 8.50c.; lead pipe, 3.25c.; zinc, 4.50c.; pewter, No. 1, 29c.; tinfoil, 32c.; block tin pipe, 33c.

St. Louis

FEBRUARY 1.—The erratic character of the spelter market still prevails. The best quotation is now 7.70c., with no certainty that any order of consequence could be filled even at that price. Lead is now quotable at 3.60c. to 3.65c.; tin, 39c.; Lake copper, 15c.; electrolytic copper, 14.75c. to 14.50c.; Cookson's antimony, 19c. In the Joplin ore market all price records for zinc blende were broken with the top price for choicest ores, on settlement, reaching $68 per ton, or $1 more than ever before in the history of the camp. The basis range for 60 per cent. ore was $58.50 to $65, the last named price being 50c. higher than the best previous basis price paid in 1912. Calamine sold at $28 to $32 for 40 per cent., with the top settlement $40. Lead ore was strong at $47 for 80 per cent. In miscellaneous scrap metals the prices quotable to-day are as follows: Light brass, 5c.; heavy yellow brass, 7c.; heavy red brass and light copper, 8c.; heavy copper and copper wire, 9c.; pewter, 20c.; tinfoil, 25c.; lead, 3c.; tea lead, 3c.; zinc, 3c.

Iron and Industrial Stocks

NEW YORK, February 3, 1915

For a portion of the past week stocks were under some pressure, largely caused by the passing of the dividend on United States Steel common. The New York Stock Exchange made several reductions in its minimum as the price of this stock fell, first at 43, next at 40 and next at 38. Each time the minimum was reached, but at 38 the sentiment changed and quite a recovery set in. Other stocks felt the influence of this betterment and stock market conditions considerably improved on Monday and Tuesday. The range of iron and industrial stocks from Wednesday of last to Tuesday of this week was as follows:

Allis-Chal., com.	9 - 9⅞	Int. Pump, com.	6
Am. Can, com.	27 - 29¼	Lackawanna Stl.	29½ - 30
Am. Can, pref.	94⅛ - 95	Pressed Stl., com.	28 - 32⅞
Am. Car & Fdy., com.	44½ - 46¾	Pressed Stl., pref.	101½
Am. Car & Fdy., pref.	114 - 114½	Republic, com.	19 - 20¼
Am. Loco., com.	21¾ - 25	Republic, pref.	72 - 76¼
Am. Steel Fdries.	28½ - 29¾	Rumely Co., com.	1¼ - 1½
Bald. Loco., com.	32¾ - 36½	Rumely Co., pref.	3¾ - 4⅝
Bald. Loco., pref.	101½ - 103	Pipe, com.	9⅛
Beth. Steel, com.	47⅝ - 49⅝	U. S. Steel, com.	38 - 48
Beth. Steel, pref.	101⅞ - 103½	U. S. Steel, pref.	102 - 105⅝
Colorado Fuel	23½ - 25½	West'gh'se Elec.	70 - 72⅜
Deere & Co., pref.	88	Chic. Pneu. Tool	49½ - 50⅝
General Electric.	142½ - 143½	Cambria Steel	42 - 44
Gt. N. Ore Cert.	29⅞ - 32½	Lake Sup. Corp.	9
Int. Harv. of N. J., com.	95 - 98	Warwick	9½
Int. Harv. of N. J., pref.	115⅝	Cruc. Steel, com.	12½ - 13⅛
Int. Harv. Corp., com.	70	Cruc. Steel, pref.	77 - 80
		Harb.-Wk. ref., com.	47
		Harb.-Wk. Ref., pref.	99
		La Belle Iron, com.	30⅛

Dividends

The Lackawanna Steel Company, regular quarterly, 1¾ per cent. on the preferred stock, payable March 1.

The American Machine & Foundry Company, 5 per cent., payable February 10.

The Inland Steel Company, regular quarterly, 1 per cent., payable March 1.

The International Harvester Company of New Jersey, regular quarterly, 1¾ per cent. on the preferred stock, payable March 1.

The International Harvester Corporation, regular

quarterly, 1¾ per cent. on the preferred stock, payable March 1.

The National Lead Company, regular quarterly, 1¾ per cent. on the preferred stock, payable March 15.

The Pressed Steel Car Company, regular quarterly, 1¾ per cent. on the preferred stock, payable February 24.

The Standard Sanitary Mfg. Company, regular quarterly, 1½ per cent. on the common stock and 1¾ per cent. on the preferred stock.

The Stewart-Warner Speedometer Corporation, regular quarterly, 1½ per cent. on the common and 1¾ per cent. on the preferred stock, payable February 1.

German Interests in French Iron Mines

The occupation by the Germans of the important French iron-ore district of Briey in Lorraine, which lies about 14 miles northwest of Metz, has raised a question as to its future and the effect on the steel industry of England, France and Belgium, as well as Germany. The greater part of the 3,811,000 tons of iron ore exported from France to Germany in 1913 came from this district.

The German works which have interests in the Briey mines are the Gelsenkirchen Company, the Thyssen Works, the Burbach Mines, the Deutsch-Luxemburg Company, the Lorraine Works of Aumetz-Friede in Kneuttingen, the Roechling Works at Voelklingen, the Phoenix, Hoerde, Hoesch and Haspe Works and the Dillingen Works. Most of the concessions owned by these companies have not been worked at all, so that the Briey basin is only at the beginning of its development. British and Belgian iron companies are also largely interested in the district. Exports to these two countries have increased considerably lately, special favors in freight rates being allowed British consumers. The German occupation has not resulted in any serious injury to the mines. Pumping was immediately resumed and ore is now being mined in large quantities and sent to west German iron furnaces as a substitute for Swedish magnetic ore.

In western France the holdings of several German companies in iron mines have been confiscated by the French government. These German holdings comprise about 4548 acres and a partial control of 5575 more acres. The geographical position of these mines renders them less important than the Briey.

New Zealand Iron and Steel Bounties

To further the development of iron and steel industries in New Zealand, says the Engineering and Mining Journal, an act has been passed under which a bounty of 12s. ($2.92) per ton of pig iron, 12s. per ton of puddled bar iron, and 12s. a ton of steel produced from pig iron is paid. There is also a bounty of 24s. ($5.84) for each ton of steel produced from molten metal direct from the furnace. Bounties are payable at these rates for the first three years after the date on which the production of material begins, and for each succeeding year the rate is reduced about 2s. (49c.) per ton in the case of all except direct production of steel from blast furnace, upon which the reduction is 4s. per ton. The total amount of bounties authorized by the act is not to exceed £150,000 ($729,975), of which not more than £75,000 ($364,987) shall be paid in respect to pig iron. The maximum bounty which may be paid in any one financial year must not exceed £30,000 ($145,995), but this may be averaged, so that if any part of that amount remains unpaid in one year, it may be paid in addition to the quota for the year following. No bounty is to be paid after March 31, 1924.

The American Pig Iron Association held its annual meeting at the Waldorf-Astoria, New York, on Thursday, January 28. The business sessions were followed by a banquet and entertainment in the evening.

A conference on screw thread tolerances is to be held in the rooms of the American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York City, at 10 a. m. Friday, February 5.

TRADE COMMISSION AND TARIFF

Proposal to Legalize Combinations to Promote Exports

WASHINGTON, D. C., February 2, 1915.—A careful canvass is being made of the membership of the House Committee on Interstate and Foreign Commerce and the Ways and Means Committee to determine the feasibility of an attempt to amend the law creating the Federal Trade Commission by specifically authorizing it to gather information to be used as a basis for tariff revision from time to time. The effort for such amendment will be made either at this session or at the extra session which now seems likely to be summoned soon after March 4.

The plan for relieving Congress of at least the preliminary work of preparing tariff revisions by placing the function in the hands of a Federal commission is rapidly gaining in strength and will command the support of influential leaders of both sides of the House and Senate. The new project is being urged on the ground that it would obviate the expense of a special board and would also place at the disposal of the tariff investigators a large amount of valuable material which the Bureau of Corporations has already gathered regarding the leading industries of the country. Neither the Interstate and Foreign Commerce nor the Ways and Means Committee shares the recently expressed view of President Wilson that the Federal Trade Commission has authority, under the law creating it, to gather material for tariff revisions, and in the event of legislation of any kind dealing with the tariff it is probable that the functions of the commission will be clearly defined.

Contemporaneously with the movement to enlarge the scope of the trade commission to include tariff investigations, a renewed effort is being made to amend the anti-trust laws so as to permit combinations of American manufacturers and exporters having for their object the extension of our foreign trade. Apropos of the foreign trade convention recently held in St. Louis, several members of the House have conferred with President Wilson in the past week hoping to secure from him some encouragement for a plan to amend the Sherman law in the interest of exporters, but the President has declined to commit himself, although he has not stated that he would oppose the project. Some of the most conservative of the majority leaders of both houses believe that such an amendment as is proposed would be an exceedingly good stroke of politics that would allay much of the hostility to the administration aroused by the great mass of anti-business legislation placed on the statute books by the party now in power.

W. L. C.

British Manganese Ore Imports Decreasing

Imports of manganese ore into Great Britain for December, 1914, were 33,230 gross tons against 70,856 tons in December, 1913, a falling off of 37,626 tons, or 53 per cent. For the year 1914 the imports were 479,435 tons against 601,177 tons in 1913, a decrease of 121,742 tons, or 20.25 per cent. In November, 1914, they were only 1230 tons. In August last the imports were 78,156 tons, or 51,511 tons in excess of the imports of August, 1913 (26,645 tons), indicating how the declaration of war diverted considerable ore to Great Britain. Total imports for the first eight months of 1914 were 356,330 tons against 406,419 tons for the same period in 1913, a decrease of 50,089 tons, or 12.3 per cent. The falling off in the last four months of 1914 was considerable, figuring out 71,653 tons less than for the same months in 1913.

A reunion of the Alumni of the Massachusetts Institute of Technology is to take place in Pittsburgh, February 19 and 20, with headquarters at the Hotel Schenley. It is the third annual convention of Technology Clubs Associated. Besides excursions and numerous reunion events, there will be a discussion of technical education.

PERSONAL

W. S. Ottinger, district sales manager of the Cambria Steel Company, Philadelphia, will become assistant general manager of sales, March 1, to succeed C. B. McElhany, who, as announced a week ago, has been appointed general manager of sales in place of J. L. Replogle, resigned. Mr. Ottinger's place as district sales manager will be filled by F. J. Krouse, who has been his assistant. Albert S. Johnson will become assistant district sales manager, the position which Mr. Krouse has filled.

D. B. McClelland, vice-president and manager of sales of Spang, Chalfant & Co., Pittsburgh, makers of iron pipe, who has been seriously ill, is convalescent and expects to be able to resume his duties this week.

William H. Barr, Pittsburgh, president National Founders' Association, will be the principal speaker at the next meeting of the Pittsburgh Foundrymen's Association, which is to be held in the Fort Pitt Hotel on Monday evening, February 15.

Frank O'Conner has been made sales manager of the Pittsburgh office of the Memphis Steel Construction Company, located in room 1601, First National Bank Building, Pittsburgh. This company is now removing its plant from Memphis, Tenn., to Greensburg, Pa.

Col. H. P. Bope, vice-president and general manager of sales of the Carnegie Steel Company, delivered an address before the McKinley Club at Youngstown, Ohio, January 30, on "Prosperity, Past and Future." He will also deliver an address before the Civic Club at Sharon, Pa., on Thursday, February 4, and on February 25 will speak at the annual banquet of the Traffic Club of Chicago.

W. S. Chase, general sales manager of the National-Acme Mfg. Company, Cleveland, Ohio, has started for the Pacific coast. After spending a short time in San Francisco, he will go to southern California, where he will remain about two months.

W. McA. Johnson has resigned as first vice-president of the Johnson Electric Smelting, Inc., New York City, but continues as director and consulting engineer of the company.

John O. Lamb has been elected vice-president and general manager of the Howard Stove Works, Omaha, Neb.

Lewis Doster, for several years secretary of the Hardwood Manufacturers' Association of the United States, and more recently in the sales department of Joshua Oldham & Co., saw manufacturers, has been appointed assistant general manager of sales for E. C. Atkins & Co., saw manufacturers, Indianapolis, Ind.

The Ayer & Lord Tie Company, Railway Exchange Building, Chicago, announces that, effective February 15, its Cleveland office, at 801 Swetland Building, will be in charge of B. S. McConnell, vice F. A. Weaver, resigned. R. W. Slaney succeeds Mr. McConnell in Chicago territory.

John J. Caine, iron and steel merchant, 140 Liberty street, New York, announces that Vosburg Horton, formerly connected with the U. S. Metal & Mfg. Company, has been engaged as successor to the late N. S. R. Anderson.

The Wagner Electric Mfg. Company, St. Louis, has elected W. A. Layman president; James W. Bell, Walter Robinson and W. S. Thomas, vice-presidents; Albert Blair, secretary, with J. W. Westcott and M. L. Franklin, assistants, and W. S. Thomas, treasurer.

Walter Alexander, district master mechanic of the Chicago, Milwaukee & St. Paul Railroad, has been appointed a member of the railroad commission of Wisconsin to succeed David N. Harlowe, former traffic manager of the Allis-Chalmers Mfg. Company, whose term expired February 1. Mr. Alexander is the first practical railroad operating official to be appointed to the commission, which consists of three members, one of whom is to represent the transportation interests of the commonwealth. He is a graduate of the college of engineering, University of Wisconsin, in which he was instructor following his graduation.

E. B. Barker, formerly with the Carpenter Steel Company, Detroit, Mich., is making preparations to open an office in that city to represent several machine-tool manufacturers. His present address is P. O. Box 203.

At a recent meeting of the Industrial Club, Covington, Ky, Clarence Roberts was elected secretary, vice F. W. Jenish, who resigned to go into business for himself.

Earl F. Scott has been appointed representative of the Terry Steam Turbine Company, Hartford, Conn., for the State of Georgia, with offices at 702 Candler Building, Atlanta. H. A. Rapelye, in charge of the Pittsburgh office, is now located at 1624 Oliver Building, that city.

Allen Hoffer, Jr., who for two and a half years has been assistant superintendent of the Warwick furnaces of the Eastern Steel Company, Pottstown, Pa., has been made superintendent of the blast-furnace department of the Worth Brothers Company, Coatesville, Pa. On the evening of January 25, prior to his departure to take up his new duties, Mr. Hoffer was given a testimonial banquet at a Pottstown hotel by his associates in the employ of the Eastern Steel Company. He was graduated from the Yale Sheffield Scientific School in 1907, and has been employed at the Warwick furnaces for the past eight years.

Guy E. Marion has established himself at 1101-4 Tremont Building, Boston, Mass., as a specialist in the organization and development of special libraries or information departments in business houses, industrial plants, etc. For the past five years he has been in charge of the information department of Arthur D. Little, Inc., Boston. Prior to that connection he was with the American Brass Company, Waterbury, Conn., as head of its information bureau. In the spring of 1910 he became secretary and treasurer of the Special Libraries Association, organized as an offshoot from the American Libraries Association, and has held this office since then by successive elections. He was graduated from Tufts College in 1903.

W. S. Phillips has been elected a director of the Bellefontaine Bridge & Steel Company of Bellefontaine, Ohio, succeeding Judge J. C. Hover. Directors of this company have elected officers as follows: J. L. Longfellow, president; F. E. Milligan, vice-president, and John E. Miller, secretary, treasurer and general manager.

C. A. Marston, of the Chain Belt Company, and F. H. Smith, of the Federal Rubber Mfg. Company, Milwaukee, Wis., were the principal speakers before the monthly meeting of the Milwaukee Efficiency Society on January 28. The meeting was devoted to discussion of the relative merits of piecework, bonus and premium systems.

Louis H. Mesker has accepted a position with the sales department of the Kearney & Trecker Company, milling machines, Milwaukee, Wis. He was until recently connected with the Anderson Forge & Machine Company, Detroit.

Henrik Greger, recently associated with the Epping Carpenter Pump Company, Pittsburgh, Pa., as assistant chief engineer, has become affiliated with the Prescott Company, shafting accessories, etc., Menominee, Mich., as mechanical engineer.

Russell B. Bedford, until recently president of the Railway Material Export Corporation, New York, has assumed the position of export manager and manager of the Eastern branch of the Clarage Foundry & Mfg. Company, Kalamazoo, Mich., with headquarters in New York.

Henry Souther, chairman of the standards committee of the Society of Automobile Engineers, has been made a life member of that society in recognition of his distinguished achievement in the orderly development of the art of automobile engineering.

Erasmus Darwin Leavitt, Cambridge, Mass., was elected an honorary member of the American Society of Mechanical Engineers on January 12. He was the second president of the society. He was born in Lowell, Mass., October 27, 1836, and was assistant engineer in the United States Navy from 1861 to 1867, was consulting engineer for the Calumet & Hecla Mining Company from 1874 to 1904 and since then has acted as consulting engineer for the cities of Boston and Louisville, Ky., and for Henry R. Worthington and others. He was awarded the degree of doctor of engineering by Stevens Institute of Technology in 1884.

W. E. Corey has been elected a director of the International Nickel Company.

Ivy Lee succeeds Jerome D. Greene as a director of the Colorado Fuel & Iron Company.

H. S. Stebbins, long well known in the Lake Superior iron ore selling trade, who recently resigned his position with Oglebay, Norton & Co., Cleveland, is now connected in a similar capacity with M. A. Hanna & Co., Cleveland.

E. M. Adams, secretary Inland Steel Company, Chicago, is on his way to California for a stay of several weeks. The trip is for the most part in the interest of rest and recreation.

E. W. Pargny, president American Sheet & Tin Plate Company, Pittsburgh, has gone to Palm Beach, Fla., for an extended stay.

N. D. Carpenter, for many years district manager of sales for the Carnegie Steel Company, Detroit, Mich., has resigned and will retire from active business. He was one of the best known of the sales agents of the Carnegie Company. He is succeeded by Frank E. Spencer, formerly assistant to A. M. Harper, city sales manager of the Carnegie Steel Company, covering the Pittsburgh district. The change became effective February 1.

Thomas S. Grubbs, for some years auditor and secretary of the Westinghouse Machine Company, East Pittsburgh, Pa., has resigned and has been elected secretary and assistant treasurer of the Union Switch & Signal Company. George F. White, also of the Westinghouse Machine Company, has resigned and has been elected assistant secretary of the Union Switch & Signal Company. The changes became effective February 1.

Steel Contractors' Association of Buffalo

The Steel Contractors' Association of Buffalo, an organization of local fabricators, has joined the National Erectors' Association, which now includes about 70 per cent. of the steel fabricating plants of the country. This move is an outcome of the differences which culminated at Buffalo last August between employers and employees in the structural business. The Buffalo fabricators at that time declared for an open shop, following the course which was being adopted by the members of the National Erectors' Association. To continue this policy they have become members of the national body. The members of the Steel Contractors' Association of Buffalo are as follows: Lackawanna Bridge Company, Progressive Structural Steel Company, C. F. Ernst & Sons Company, Farrar Iron & Steel Company, Jones Iron Works, Buffalo Structural Steel Company, Kellogg Structural Steel Company, United Steel Erection Company, Thompson Steel Construction Company, August Feine & Sons Company, Wertenstein & Weimar and Ferguson Steel & Iron Company. George S. Kellogg is chairman of the local organization.

H. G. Stott, superintendent of motive power of the Interborough Rapid Transit Company, New York, has been invited by the council of the American Society of Mechanical Engineers to act as chairman of a committee to co-operate with the manufacturers in the recommendation of flange standards for hydraulic work, including heavy pressures.

OBITUARY

MAX ROBINSON, president Auburn Wagon Company, Martinsburg, W. Va., died January 31, aged 53 years. He was born in Fernandina, Fla., and until 16 years ago, when he took charge of the Auburn Wagon Company, he had been in business in Savannah and Jacksonville. Under his management the company was built up until it is one of the largest industries of its kind in the entire South. Mr. Robinson was head of the Travelers' Protective Association of the South for many years. He leaves his widow.

A. G. HATHAWAY, Ohio representative of the David Lupton's Sons Company, Philadelphia, died at his home in Cleveland, Ohio, January 25, of paralysis, aged 52 years. The Cleveland business of the Lupton Company will hereafter be conducted under the company's name and the office will be moved from the Cuyahoga Building to the Swetland Building February 15.

AMBROSE A. MCHOSE, formerly of Reading, Pa., and for many years prominently connected with the iron trade, died January 22 at his home in Philadelphia, aged 64 years.

PETER CASSEL, president of the Northwestern Metal Company, Milwaukee, Wis., died January 28, aged 65 years.

New Iron and Steel Institute Members

At the meeting of the directors of the American Iron and Steel Institute, held Friday, January 29, the following were elected to membership: Associate members, Harry C. Busch, vice-president Cincinnati Iron & Steel Company, Cincinnati; George A. Crocker, iron and steel, 30 East Forty-second street, New York. Active members: J. Stanford Fraser, blast furnace superintendent, Pittsburgh Steel Company, Monessen, Pa.; Joseph A. McDonald, general superintendent, Cambria Steel Company, Johnstown, Pa.; Richard Fitz Randolph, general superintendent, Bethlehem Steel Company, South Bethlehem, Pa.; William Frank Roberts, general superintendent, Bethlehem Steel Company, South Bethlehem, Pa.; Thomas E. Thomas, secretary Thomas Furnace Company, Niles, Ohio.

Officers of the Efficiency Society

Following the annual meeting of the Efficiency Society, which was held in New York City Monday, January 25, the new board of directors then elected met on Tuesday and elected Dr. Melvil Dewey, Lake Placid Club, Lake Placid, N. Y., as president. Dr. Joseph French Johnson, New York University, and F. R. Hazard, president of the Solvay Process Company, Syracuse, were elected vice-presidents. Elihu C. Church was reelected secretary and Robert W. Walker was reappointed assistant secretary and treasurer, with headquarters at 41 Park Row, New York City. Instead of monthly meetings in New York it is proposed to hold about four meetings through the year, so that larger meetings may be likely to meet the speakers of national importance which it is proposed to secure.

Ohio Sheet Metal Contractors Organize

The Ohio Master Sheet Metal Contractors' Association was organized at Columbus, Ohio, January 28. Preliminary meetings were held at the Virginia Hotel on the day mentioned, and in the evening a dinner was served at the Builders' & Traders' Exchange, after which came a business meeting and the election. The following officers were chosen: President, George E. Snyder, Columbus; vice-president, F. J. Hoersting, Dayton; secretary, W. D. Weaver, Columbus; treasurer, Clayton Murphy, Toledo. The board of trustees is made up as follows: George E. Techmaster, Cleveland; J. J. Dalzell, Cleveland; M. D. Armstrong, London; John Weigel, Cincinnati, and A. E. Faunce, Columbus. The next meeting will be held at Dayton, Ohio, June 3.

Pittsburgh and Nearby Districts

Stockholders of the Brier Hill Steel Company, Youngstown, Ohio, met last week and elected officers as follows: H. H. Stambaugh, chairman; W. A. Thomas, president; John Tod, first vice-president; R. C. Steese, general manager; J. G. Butler, Jr., vice-president; J. E. Parker, secretary; John Stambaugh, treasurer; J. B. Kennedy, general counsel. Advisory committee, E. L. Ford, chairman; H. H. Stambaugh, John Tod and David Tod. The proposed bond issue of $2,000,000 in 6 per cent. serial first mortgage bonds, maturing in equal instalments from 1916 to 1926, was approved.

The Penn Electric Mfg. Company, Erie, Pa., whose plant was destroyed by fire December 24, will erect near the site of the old structure a steel and brick building to cost about $75,000, and new equipment will be needed.

Stockholders of the National Enameling & Mfg. Company, Youngstown, Ohio, met last week and elected directors as follows: William Wilkoff, John T. Harrington, C. H. Allman, M. H. Jones and L. C. Wilkoff. The directors organized by electing the following officers: William Wilkoff, president and treasurer; John T. Harrington, vice-president; L. C. Wilkoff, secretary; C. H. Allman, general manager, and Charles R. Hughes, assistant secretary and auditor.

The new warehouse of the Carnegie Steel Company, Pittsburgh, at Allston, near Boston, Mass., was opened for business on Monday, February 1. This warehouse will serve the New England territory and for the present, at least, will handle exclusively products of the Carnegie Company.

Stockholders of the Youngstown Foundry & Machine Company, Youngstown, Ohio, held their annual meeting last week and elected directors as follows: W. J. Wallis, F. A. Williams, B. G. Parker, A. E. Adams, F. K. Hine, E. Hartzell and H. P. Parrock. The directors organized by electing W. J. Wallis, president; F. A. Williams, vice-president and sales manager, and B. G. Parker, secretary and treasurer.

Stockholders of the Western Conduit Company, Youngstown, Ohio, held their annual meeting last week. Directors were elected as follows: L. J. Campbell, J. A. Campbell, Richard Garlick, W. E. Manning and George F. Holley. The directors elected L. J. Campbell, president; Richard Garlick, vice-president; George F. Holley, secretary and general manager of sales, and W. J. Morris, treasurer. The annual report showed a satisfactory increase in business.

At the annual meeting of stockholders of the La-Belle Iron Works, Steubenville, Ohio, which will be held in Wheeling, W. Va., February 9, it is likely that the matter of consolidation with the Wheeling Steel & Iron Company will be definitely settled. It is said that the directors of both companies favor the consolidation.

The Massillon Rolling Mill Company, Massillon, Ohio, manufacturer of black and galvanized sheets, has posted notices of a reduction of about 14 per cent. in wages of heaters and rollers.

At the annual meeting of stockholders of the Wheeling Mold & Foundry Company, Wheeling, W. Va., held January 28, the board of directors was increased from 9 to 11, the new members being John A. Stevenson and Friend Cox. All the former directors and officers were re-elected. H. E. Field, president, in his annual report, states that prospects for this year are encouraging. He reports that work has been begun by the company under the new contract for New York subways, aggregating 47,000 tons, with a valuation of $1,250,000, deliveries to be made over 18 months.

The export trade journal, El Comercio, which has had its offices at 126 Liberty street, New York, for 25 years, will remove February 10 to the eighth floor at 114-118 Liberty street. C. E. Wright, formerly of the editorial staff of Hardware Age and afterward with Hearst's Magazine, and Paul F. Wiggin, at one time connected with the business department of *The Iron Age*, have joined the staff of El Comercio.

Amalgamated Association and Wage Reductions

PITTSBURGH, PA., February 3, 1915.—(*By Telegraph.*)—Another meeting of the conference committee of the Amalgamated Association and the sheet and tin-plate mill owners that sign the Amalgamated scale was held in Pittsburgh yesterday and the request of the manufacturers for a reduction in wages on sheet and tin-mill labor was discussed at some length. The owners ask for a reduction of 10½ per cent. on tin-plate labor and 14 per cent. on sheet-mill labor in order to put them on an equal basis with reductions in wages already made by sheet and tin mills that operate non-union and do not sign the Amalgamated scale. The meeting adjourned late last night without anything definite being done, but to-day the Amalgamated Association committee was in conference here and met again with the manufacturers this afternoon. The Amalgamated scale conditions require that any proposed reduction in wages during a scale year must be referred to the members of the Amalgamated Association for a referendum vote and this will probably be taken within a short time.

The Dominion Steel Corporation in 1914

In common with all the iron and steel companies in the United States and Canada the Dominion Steel Corporation, Ltd., suffered severely last year. Domestic consumption and orders were very much curtailed during the first half, but furnaces and mills were kept pretty well occupied. Good business was booked for the second half, but work had only fairly begun when war was declared, and owing to the general breakdown of financial arrangements orders were canceled and deliveries postponed to such an extent that the management was compelled to close down the works at Sydney, Nova Scotia, almost completely. Efforts were made with some success to obtain a market in Great Britain and other parts of Europe, and operations were resumed and gradually increased until at the close of the year the force was nearly two-thirds of the normal. The coal business was not affected in anything like the same degree, and except for the decrease in coal consumption at the steel works the output would have been about the same as in the two previous years.

Cleveland Superintendents and Foremen

Under a new plan for holding meetings adopted by the Metal Trades Superintendents' and Foremen's Club of Cleveland, Ohio, the regular monthly meetings have been discontinued and in their place meetings will be arranged by the executive board which will secure prominent speakers to address the members. These meetings will not be held at any stated intervals, but at times when suitable speakers can be secured. The first meeting under the new plan will be held at Schuster's Cafe, East Twelfth street, January 30. Following a dinner an address will be delivered by Charles E. Adams, president Cleveland Hardware Company, who will talk on the duties of a superintendent or foreman and on business conditions.

Heavy Hardware Jobbers' Association

At the annual meeting of the Heavy Hardware Jobbers' National Association, held at the Hotel LaSalle, Chicago, January 21 and 22, with about 30 members present, the following officers were elected: President, W. J. Dean, Nicols, Dean & Gregg, St. Paul, Minn.; first vice-president, Hayden Robinson, E. D. Kimball & Co., Chicago; second vice-president, R. R. Engelhart, Sieg Iron Company, Davenport, Iowa; third vice-president, H. F. Teefeld, Suelflohn & Seefeld, Milwaukee, Wis. Roy S. Tuttle was re-elected secretary-treasurer.

The J. I. Case Threshing Machine Company, Racine, Wis., has booked an order from its branch at Odessa, Russia, for 55 motor vehicles for the Russian army operating in the Turkish field. Delivery is to be made at once.

Machinery Markets and News of the Works

An improved and more widely distributed demand is seen throughout the country with less emphasis laid on export sales, though these are still large and impressive. The machine tool trade is benefiting from the buying which is being done by manufacturers whose facilities are taxed to fill foreign orders for various products. Business due directly or indirectly to the war has prominence in New York, but details for publication are not willingly given. The improvement in New England extends to various industries, largely because of foreign demand making revisions of equipment necessary. January was better than December in Detroit, though most of the purchases were small and a bad feature there is the lack of building. In Cincinnati there is a good demand for small special electrical equipment and metal-working machinery, while wood-working machinery shows some improvement also. Export business is supporting the market in Milwaukee which otherwise is dull, though it is noted that the malleable iron foundries are busier than in some time. In the Central South some improvement is noted in the call for machinery. Second-hand tools are in fair demand in the Birmingham district, and there is increased inquiry for new machine tools and equipment. In St. Louis a slow, but steady betterment is noticed. Conditions in Texas are unchanged. Miscellaneous equipment is selling well in the interior of the Pacific Northwest, but the machine tool trade is making little headway in that territory.

New York

NEW YORK, February 2, 1915.

Business which is directly or indirectly an outcome of the European war is again in strong evidence in this market. Some big deals are pending, principally for export, but like their predecessors they are hedged about with secrecy and those concerned will not permit mention of details until the machines to be purchased have been designated. Some of this business is to be placed direct from Russia and some by foreign agents now in this country. Nearly all of the machines required have to do with the manufacture of shrapnel, mostly abroad, though American concerns are interested also. One sale recently made by a Western manufacturer of milling machines was for over 100 tools, the sale being negotiated by a New York house. Turret lathes are in especially heavy demand. The American Brass Company, Waterbury, Conn., was a recent buyer of between $12,000 and $15,000 worth of machine tools.

An Eastern company which is manufacturing munitions of war is inquiring for about 30 machines and a representative of a Petrograd company who is at a New York hotel is inquiring for about 130 machines, mostly such as are used in the manufacture of shrapnel. The representative of a company located in northern Pennsylvania has just returned from Europe with a large contract and according to report has placed and order for about $165,000 worth of machinery. The facts are neither confirmed nor denied by the interested parties, so great is their desire to avoid publicity.

In the way of strictly domestic business, sales continue to be of the scattered variety and most of them small. Dealers in this city are beginning to get a larger share of the war business, otherwise conditions with them would be very poor.

The business in overhead tracking, small cranes, etc., which for some years has been conducted by the Patterson-Allen Engineering Company, 2 Rector street, New York, has been taken over by the Clevenger Engineering Company with an office at the same address. The latter company, of which O. L. Clevenger is the head, has leased a part of the plant in Jersey City of the Patterson-Allen Engineering Company, but is contemplating the establishment of a plant of its own. The Patterson-Allen Engineering Company will continue the manufacture of its line of Everlasting valves and pipe flanging machinery.

The Waclark Wire Company, Bayway, N. Y., has let contract for the construction of a one-story addition to its manufacturing plant, to cost $40,000.

The Harrison Radiator Works, Lockport, N. Y., of which Oliver Diahl is president, will build a two-story addition to its plant, 70 x 85 ft.

The recent fire reported in the plant of the Westmoreland Malleable Iron Company, Westmoreland, N. Y., did very little damage, and the coreroom and foundry equipment are undamaged.

J. B. Pierce, Schenectady, will build a power house and garage, 34 x 50 ft., one story and basement.

The Fuso Mfg. Company, Kingston, N. Y., has filed articles of incorporation with a capital stock of $30,000 to manufacture sanitary ware, concrete articles for buildings, etc. F. Kaufman, J. J. Herb and J. G. Van Etten, Kingston, are the incorporators.

The G. O. Saunders Company, Boston, Mass., manufacturer of concrete machinery, has secured a site at Leroy, N. Y., on which it will erect a factory. Plans are being drawn.

The Ford Motor Company, Detroit, has had plans prepared by the Condon Company, engineers, 53 West Jackson boulevard, Chicago, for an assembling plant, 200 x 450 ft., four stories and basement, of reinforced concrete, which it will erect in Buffalo on a site at Main street and the New York Central Railroad Belt Line, at an estimated cost of about $400,000.

The Best Made Garment Company, Poughkeepsie, N. Y., of which Homer J. Bloomer is president, is having plans prepared for a two-story factory which it will erect on Rose street at an estimated cost of $25,000.

Bids are to be taken February 20 by J. G. Warren, United States Engineer, Federal Building, Buffalo, for the construction of six gatehouses and a storehouse to be built by the United States Government at the United States Ship Canal lock, Black Rock Harbor, Buffalo. The estimated cost is $50,000.

The Elba Food Products Company, Batavia, N. Y., has filed incorporation papers with a capitalization of $125,000, and will establish a canning plant. R. M. Decker, K. B. Mathes and S. W. Elliott are the incorporators.

The Lander & Watson Hosiery Company, Perry, N. Y., will move its plant to Ellicottville, N. Y., and erect a two-story brick factory. It has been re-incorporated with a capital stock of $50,000 by W. D. Walrath as president, and R. J. Lander, secretary.

G. Levor & Co., Gloversville, N. Y., has been incorporated with a capital stock of $500,000 and will manufacture leather, etc. The incorporators are G. Levor, 90 Gold street, New York City; S. Rothschild and F. H. Miller, Weehawken, N. J.

The Rogers Wire Works, 291 Broadway, New York, has bought the property of the De Witt Wire Cloth Company, and will continue the business as before. It will specialize in wire shade cloth, rope and cord. Robert Rogers is president; Clarence De Witt, treasurer; and I. B. Blaurock, secretary.

Philadelphia

PHILADELPHIA, PA., February 1, 1915.

Ballinger & Perrot, architects and engineers, 1211 Arch street, Philadelphia, Pa., have awarded contract to Mitchell Brothers, 2125 Race street, Philadelphia, for alterations and additions to the S. J. Cresswell Iron Works, Twenty-third and Cherry streets, Philadelphia, to replace the portion of their plant recently destroyed by fire. The new building will be two and three stories, of brick construction, and will have a frontage on Twenty-third street of 140 ft., and on Cherry street of 122 ft.

The Kramer Auto & Carriage Company, Lancaster, Pa., has been incorporated with a capital stock of $5000 by I. N. and G. R. Kramer, Goodville, Pa., and Edward McLaughlin, Lancaster, Pa., to manufacture vehicles and commercial automobile bodies. It has leased the former factory of S. E. Bailey & Co., on North Queen street, Lancaster. Edward McLaughlin is president, and I. N. Kramer, purchasing agent.

The Clarke Can Company, Twelfth and Fitzwater streets, Philadelphia, manufacturer of druggists' tinware, has purchased the plant and equipment of the Taite & Sisler Company, and will manufacture similar goods. It is, however, an entirely separate company. J. A. Clarke is in charge.

The Turner Construction Company, 11 Broadway, New York City, has been awarded the contract for a reinforced mechanical building for the Baltimore division of the

Standard Oil Company of New Jersey, 26 Broadway, New York. The building, which is to be erected at Canton, Md., will be 50 x 200 ft., two stories. Work will be undertaken at once.

Ventnor, N. J., has voted $75,000 to defray the expenses of installing a sewerage disposal plant.

New England

BOSTON, MASS., February 2, 1915.

The actual improvement in business, while not universal, extends to a wide variety of industry, outside of as well as within the metal lines. Textiles are feeling the change in rather an important way. Shoes are apparently in greater demand. Generally speaking everyone feels confidence in the future, believing that the turn has come and that from now on business will improve, though probably slowly, with the usual relatively large demand in April and May. War orders still hold the most prominent place, and their volume is not diminishing, nor are they likely to diminish; because European nations are becoming more and more dependent upon American products. Manufacturers of machine tools which are used in connection with supplies for the armies and navies are booking large orders. The development of machinery for these special purposes has been rapid, and the financial reward is correspondingly great.

Most significant is the improvement in the textile machinery industry. New England has a number of important plants which manufacture this class of equipment. The variety of machines is great, covering the whole field of textiles. Consequently one line may be dull, even in good normal times, while the others are very busy. The only way to consider the industry is by striking an average. This average has gone up in the last few weeks. Silk machinery is still in great demand; but that is not a new condition. This branch of textiles has not felt the depression very much, owing to the decreasing supply of foreign goods, and to the fashions. Cotton machinery is in greater demand, which is a real change and affects thousands of workers. Woolen machinery continues dull, with improvement in isolated lines. Knitting machinery is in active demand, and so is equipment for the manufacture of narrow fabrics. Much of the machinery that has been ordered in recent months has been for the manufacture of fabrics and garments for use in the European armies; but today the improvement seems to be along what are termed "legitimate" lines of business.

The railroads are not coming into the market for machinery to any marked extent. Some inquiries, however, have been made which encourage manufacturers of these lines of equipment.

Not a few companies manufacturing staple lines in which metal material plays a prominent part are taking on specialties wholly foreign to their regular products. Most of these new products enter into munitions of war of one sort or another. The demand for such goods is so great that it is a profitable diversion of industrial activity to get into. Inventive enterprise, or rather the ability to adapt an industry to a new purpose on short notice, has proved very lucrative in many cases. A considerable amount of new equipment has been purchased on this account.

A large aggregate of extensions of industrial works in New England is not indicated in the immediate future. Many manufacturers have tentative plans for additions to their works, but are waiting for a definite assurance of good business conditions. The spring will probably see as great an increase in manufacturing capacity as last year, which was not great.

Potter, Johnston & Gridley, Ltd., is proceeding rapidly with the erection of its shops in England, which are now receiving the roof. In these works the Potter & Johnston Company, Pawtucket, R. I., and the Windsor Machine Company, Windsor, Vt., will build their machines for the English market. Plans for the operation and equipment of the shops have not yet been completed.

The Standard Mfg. Company, Bridgeport, Conn., is erecting an addition to its factory, which will almost double its present manufacturing space. The new building is 45 by 80 ft., two stories and basement. The company manufactures machine tools, special machinery, and metal specialties and parts, such as screw machine and pressed metal work.

The Coulter & McKenzie Machine Company, Bridgeport, Conn., will receive quotations on foundry equipment, including a belt-driven air compressor of about 350 ft. capacity, sand blast outfit, chipping tools, etc. The equipment will be for heavy work, and should take care of 15 to 20 tons per day. F. L. Cogill is president.

The Locke Steel Belt Company, Bridgeport, Conn., manufacturer of sprocket chain, is occupying a handsome and commodious building which has recently been completed in that city. The factory embodies many improvements in equipment as well as in convenience, and affords large additional space, which was required by the growth of the business.

The Saco-Lowell Shops, 77 Franklin street, Boston, Mass., has received an order for textile machinery, excepting looms, for the Naumkeag Steam Cotton Company, 51 Peabody street, Salem, Mass., to replace its equipment destroyed in the recent fire. The order is for future delivery, contingent upon the completion of its new factory, and will total $300,000.

Chicago

CHICAGO, ILL., February 1, 1915.

The local machinery trade is noticeably lacking in business of very attractive character, although the long continued dearth of profitable orders lends desirability to every trade that can be turned. The past week brought quite a number of small orders; but the total business has fallen off somewhat from the previous fortnight. The machine tool business continues to feel the benefit of foreign orders although the dealers are but little helped.

Hatzfeld & Knox, architects, 7 South Dearborn street, Chicago, are preparing plans for a foundry and machine shop, 50 x 125 ft., one story, to cost $12,000.

The Ilg Ventilating Company, 154 Whiting street, Chicago, is about to erect a one-story factory, 48 x 100 ft., to cost $7000.

George F. Dippell, 7028 Ridge avenue, Chicago, has completed plans for a two-story factory, 86 x 87 ft., to cost $25,000.

Fire did considerable damage to the foundry of the American Rotary Valve Company, Anderson, Ind.

The Bright Mfg. Company, 204 Castle Hall Building, Indianapolis, Ind., is being organized with a capital stock of $75,000 to manufacture carburetors and other patented accessories for motors, etc. It will be in the market for a complete brass foundry equipment and other machinery. J. R. Crawford is general manager.

The U. S. Wheel & Tire Company expects to break ground for its new factory at Rockton, Ill., not later than March 1.

The plant of the Michigan Metal Products Company, Battle Creek, Mich., burned to the ground with a loss estimated at $10,000.

The S. & S. Automatic Grate Company, 840 West Sixty-third street, Chicago, Ill., manufacturer of stokers, has recently increased its capitalization for the purpose of taking care of its increased business. Machinery requirements have not yet been formulated. W. S. Schultz is manager.

The Globe Machinery & Supply Company, 205 West Court avenue, Des Moines, Iowa, which has recently purchased a site for a factory, will not build there for several years. F. W. Swanson is manager.

The Standard Cap & Seal Company, Chicago, has been incorporated with a capital stock of $50,000, to manufacture machinery, seals and bottle caps. The incorporators are Annette B. Blunk, George W. Kreuzinger and Christian H. Brinton. It is not in the market for any machinery.

The Wallace Supply Company, Chicago, Ill., has changed its corporate name to the Wallace Supplies Mfg. Company. This change was made to direct attention to the fact that in addition to building ring, bar, eye and pipe bending machinery, the company is equipped to manufacture specialties. The principal office and factory is located at 420 Orleans street, Chicago, with a branch office at 233 Broadway, New York City.

The Stanley Tack Works, Belleville, Ill., has been destroyed by fire with a loss of $15,000 on equipment. The plant will be rebuilt and new equipment installed as quickly as possible.

The State of Nebraska has voted to spend $3,000,000 for the University of Nebraska, Lincoln, Neb. Most of the money will be used for buildings. Among these will be structures for the electrical, civil and agricultural engineering departments. Plans for the last mentioned are about ready for bids. The amount of the funds to be expended for machinery equipment is small.

The Plymouth Gypsum Company, Ft. Dodge, Iowa, has purchased property upon which it will erect a gypsum mill to increase its output 50,000 tons a year. L. E. Armstrong is president.

The Hallette Ice & Coal Company, Spartanburg, S. C., has been incorporated with a capital stock of $32,000, and has awarded the contract to the Willard-Boggs Company for the construction of an ice plant. C. C. Walker is manager.

The Northern Insulating Company, 1340 University avenue, St. Paul, Minn., is erecting a factory, 106 x 206 ft., at a cost of $25,000.

Milwaukee

MILWAUKEE, WIS., February 1, 1915.

At the close of a month that showed only a slight improvement in machinery business, a local manufacturer announces that it has started to make deliveries of an export order for 120 milling machines for the French Government. But for an active export demand, machine-tool makers would be at a loss to know how to keep their shops running, domestic demand showing very little improvement thus far. Throughout Wisconsin a similar condition exists. One large malleable foundry has reopened on a small scale; and this division of the metal trades is generally better than for some time. The consensus of opinion is that not much improvement can be expected before March 1. Structural prospects are not any better than a year ago and the year's tonnage will not be materially heavier than that of 1914.

The Kearney & Trecker Company, West Allis, Milwaukee, Wis., started to make deliveries late last week on an order for 120 milling machines for the French Government, involving about $120,000, according to E. J. Kearney. It was received several months ago and came through the usual channels from the company's regular agent in France. The Kearney & Trecker shops will continue to operate with a full crew until the order is filled, which is expected to consume at least another month's time.

The Globe Pump Company, Green Bay, Wis., has deferred the establishment of a branch factory in Winnipeg, Man., indefinitely. It has arranged with a foundry in that city to manufacture cylinders to take care of its Canadian trade. R. I. Byington is manager.

In spite of the fact that the European war has cut off its annual importation from Germany of thousands of small thermometers for advertising novelties, the Aluminum Sign Company, Kewaunee, Wis., is experiencing the busiest season in its history. Arrangements have been made for American manufacture of the thermometers. The company is enlarging its plant and will purchase 12 electric motors for individual drive on pressing, stamping and embossing machines.

Charles H. Duback, manager of the Hewitt Mfg. Company, brass founder, Milwaukee, has organized the Magnus Company to manufacture metal products. It has been incorporated with a capital stock of $50,000. William F. Libau and John Jackson are associated with Mr. Duback.

Ownership of the Aerial Cutlery Company, Marinette, Wis., has passed into the hands of C. S., F. H. and R. E. Jaeger, by the purchase of the interest of J. D. Phillips, who organized the concern in association with the Jaeger brothers. C. S. Jaeger becomes president and general manager, and John Nehlen continues as plant manager. Some improvements are planned to the shop.

The Rex Gasometer Company, Beloit, Wis., has been incorporated with a capital stock of $35,000 by W. H. Corcoran, R. H. Goodwin and E. R. Young to manufacture measuring devices for gasoline, oil, gas, etc.

Christ A. Kinney, Colfax, Wis., has sold his garage and machine shop and will erect a new and larger plant in the spring.

The Koehring Machine Company, Milwaukee, manufacturer of power concrete mixing and road construction machinery, has increased its capital stock from $100,000 to $300,000. It erected a factory addition last fall and plans further extensions this year. Philip A. Koehring is secretary.

The board of supervisors, Columbia County, has voted $15,000 for the construction of a central heat, light and power plant at the county institutional group at Wyocena, Wis. Plans are now being prepared.

The Oshkosh Metal Products Company, manufacturer of boat supplies, novelties, etc., Oshkosh, Wis., has filed a voluntary petition in bankruptcy, scheduling liabilities at $44,133 and assets at $15,339.

The Straubel Machine Company, marine engines and repairs, Green Bay, Wis., is preparing to construct a new dock and plant addition and will purchase a hoist.

The Lueck Mfg. Company, wire and metal specialties, Enterprise Building, Milwaukee, is now devoting considerable attention to the manufacture of ice machines and small refrigerating plants for residences and hotels.

The George T. Stehling & Sons Company, 549 Tenth street, Milwaukee, vehicle and truck manufacturer, is having plans prepared for the remodeling and enlargement of its plant at a cost of $15,000.

The Rockwell Mfg. Company, 572 Park street, Milwaukee, maker of hardwood finish, flooring, etc., has engaged Thomas S. Watson & Co., engineers, 1412 Majestic Building, Milwaukee, to remodel and enlarge its power plant. New boilers, power equipment, generator and motors will be required.

Cleveland

CLEVELAND, OHIO, February 1, 1915.

Dealers report more inquiry and a better volume of business in single tools. Conditions with some manufacturers in metal-working lines are improving, and dealers who have recently canvassed this territory find the outlook for more activity in heavy machine tools more promising than for a long time. The White Company, Cleveland, which has been crowded for several months with export orders for motor trucks is purchasing additional machine tool equipment; and the Ohio Corrugating Company, Warren, is buying special sheet-working machinery for its new plant. The foreign demand for lathes and automatic machinery is holding up, as well as the improvement previously noted in the domestic demand. The plant of one Cleveland builder of lathes is being operated at full capacity double turn. Others are running overtime. Lathes have become very scarce for early delivery. In the foundry trade jobbing plants are getting an improved volume of business and local foundries are now running on an average of about 60 per cent. of capacity.

The Chandler Motor Car Company, Cleveland, has awarded contracts for an addition to its plant.

The Cleveland Saw Guard Company, Cleveland, has been incorporated with a capital stock of $5000 by W. F. Holliday, A. M. Clevenger, and others, to manufacture saw guards and other safety devices for machinery.

The Lincoln Electric Company, Cleveland, will enlarge its plant by the erection of a three-story office building 45 ft. square.

The Rath Aluminum & Brass Foundry Company, New Philadelphia, Ohio, has been incorporated with a capital stock of $40,000 by C. J. Rath, N. W. Senhauser, R. S. Barton, C. H. Marlow, and others.

The W. H. Mullins Company, Salem, Ohio, will enlarge its plant by the erection of a one-story stock room, 127 x 140 ft.

The Ohio Engine Company, Sandusky, Ohio, recently incorporated by Mack H. Joy and others, has decided to locate its plant in Sandusky.

The Vulcan Mfg. Company, Painesville, Ohio, automobile manufacturer, has been placed in the hands of Carl D. Friebolin, as receiver. It is stated that financial difficulties have resulted from lack of capital and that the company will be re-organized shortly.

The Falls Rubber Company, Cuyahoga Falls, Ohio, has increased its capital stock from $200,000 to $300,000, and it is stated it contemplates the erection of a four-story addition.

The A. Bentley & Sons Company, Toledo, Ohio, has been awarded the contract for the additions to the Willys-Overland Company's automobile plant. The new structure will be 200 x 1000 ft., three stories, of brick, steel and concrete.

The Banting Mfg. Company, Toledo, Ohio, recently incorporated with a capital stock of $400,000 plans to erect a large plant for the manufacture of grain separators and other farm machinery.

Cincinnati

CINCINNATI, OHIO, February 1, 1915.

Builders and contractors from every section of the country attended the annual convention of the National Association of Builders' Exchanges, held in Columbus, Ohio, last week. Those from the Central West were nearly unanimous in reporting the building outlook for 1915 as being very promising. However, few plans have been made for new manufacturing buildings.

A let-up is noticed in orders from abroad for lathes and screw machines. No improvement is noted in the demand for any kind of tools from the railroads, which have now been very poor customers of machine tool builders for a long time. Predictions that they would enter the market soon after the first of the year have not been verified. Scattered business comes from the automobile and auto-truck manufacturers; but it is not yet by any means up to normal.

Some excellent reports are received from makers of small special electrical equipment. Metal-working machinery is also in good demand. Second-hand machinery dealers are only doing a fair business. Wood-working equipment shows some improvement.

The George H. Streitmann Sons Company, Cincinnati, is having plans prepared for a large private garage to be erected at Plum and Charles streets.

Middletown, Ohio, will open bids February 11 for two 250-hp. return tubular boilers. W. P. Butterfield is chair-

man of the board of commissioners. Pollard & Elms, Union Central Building, Cincinnati, are the consulting engineers.

Dayton, Ohio, is planning a three-story concrete municipal garage and repair shop.

The Peckham Coal & Ice Company, Troy, Ohio, is having plans prepared for an ice plant to be erected in Dayton, Ohio. Frank Peckham is president.

The Latty Die & Tool Company, Columbus, Ohio, has been incorporated with $10,000 capital stock by G. F. Latty and others. It is rumored that L. R. Ford, of the Jeffrey Mfg. Company is interested in the company.

The Hub Motor Truck Company, Columbus, Ohio, has been incorporated with $300,000 capital stock, by T. C. Hanly, John J. Chester, and others. Manufacturing plans have not yet been given out.

The Burkett Mfg. Company, manufacturer of gas engines, corn huskers and other farm specialties, Columbus, Ohio, has tentative plans under way for an addition to its plant.

The Butler Fan & Motor Company, Newark, Ohio, has been incorporated with $10,000 capital stock to manufacture electric fans. James K. Dewey is one of the principal stockholders.

The C. Hines & Son Mfg. Company, Napoleon, Ohio, is making an addition to its sheet metal-working plant that will materially increase its output.

L. C. Coffman, Washington Courthouse, Ohio, is interested in a new company that has acquired a plant for the manufacture of household specialties.

Detroit

DETROIT, MICH., February 1, 1915.

January business in this territory showed much improvement over the previous month, although the market continued to be uneven and but few sizable purchases were made. The past week has been devoid of features; the usual run of single tool orders was booked, and some demand for special equipment appeared. Inquiry is increasing, but its character does not indicate any great enlargement of activity in industrial circles, as the majority of the requirements are for one or two tools evidently for replacement purposes or to fill in a gap in equipment. Second-hand machinery is quiet. The foundry situation shows little change; but the outlook is for the better. Building circles are inactive, the extremely cold weather tending to hold operations to a minimum.

Annual meetings of the stockholders of a majority of the large manufacturing companies were held the past month and some large increases of capital stock have been made. This is said to augur well for extensions of activity in industrial circles.

The Detroit Brass Works, Detroit, has increased its capital stock from $250,000 to $400,000.

The Waterman Marine Motor Company, Detroit, has increased its capital stock from $40,000 to $80,000 and changed its name to the Waterman Motor Company.

The Gearless Differential Company, Detroit, has increased its capitalization from $50,000 to $75,000.

The Detroit Tapering Radiator Company, Detroit, has been incorporated with $25,000 capital stock to manufacture automobile radiators. Joseph A. Moross and Benjamin C. Loring are the principal stockholders.

The Detroit Hydrogen Burner & Stove Company, Detroit, has been incorporated with $10,000 capital stock to manufacture vapor stoves. The incorporators are E. G. Mummery, Alfred Declerc and W. G. Huard.

The A. B. Miller Chicory Company, Port Huron, Mich., is having plans prepared for the erection of a plant to cost about $100,000. A. Van Slembrouck is general manager.

The Frost Gear & Forge Company, Jackson, Mich., has increased its capital stock from $300,000 to $400,000.

The Bear River Paper Company, Petoskey, Mich., will install a bleaching plant and add equipment for the manufacture of high-grade paper. The improvements will involve an expenditure of about $25,000.

The Auto Body Company, Lansing, Mich., has increased its capital stock from $250,000 to $500,000.

The Republic Motor Truck Company, Alma, Mich., has increased its capital stock from $50,000 to $150,000 and has enlarged its plant by the purchase of an additional factory.

The C. H. Dutton Company, Muskegon, Mich., is completing a boiler shop 80 x 120 ft., of steel and concrete construction. It reports a good volume of orders and the outlook very encouraging.

The E. I. Dupont de Nemours Powder Company, Wilmington, Del., will establish a branch plant at Grayling, Mich., to cost $150,000. It will produce alcohol, acetate of lime, and charcoal.

Friday Brothers, Coloma, Mich., will erect a canning plant.

The South Haven Chemical Company, South Haven, Mich., is adding to its machinery equipment.

The Central South

LOUISVILLE, KY., February 1, 1915.

Some improvement in the general situation is reported by machinery men. A movement of cotton for export at higher prices has caused better feeling and improved collections in the South. The number of inquiries is larger than it has been for several months, and provided the percentage of sales developed keeps up, the prospects point to a satisfactory volume of business.

The Snead Architectural Iron Works, Ninth and Hill streets, Louisville, is planning to install alternating current motors to take the place of its direct current equipment.

Plans for the operation of the Louisville plant of the old Louisville Bolt & Iron Company under the name of the Louisville Steel & Iron Company, for the manufacture of sheet steel, are assuming more definite form. R. A. McDowell, a Louisville attorney, is representing the promoters.

The American Box & Crate Company, Louisville, has been incorporated with $10,000 capital stock. This concern was referred to recently in *The Iron Age* as the Falls City Box & Basket Company. It is to build and equip a factory.

The Electric Popcorn Machine Company, Indianapolis, will establish a plant in New Albany, Ind. F. H. Kahler, who operates an iron-working plant in New Albany, is one of the stockholders.

Walker & Lee, Monticello, Ky., are equipping a stone-cutting plant. Power and special machinery will probably be needed.

A. H. Hopkins, Dorchester, Va., has leased a tract of coal land at Sergent, Ky., and will install a plant with a capacity of 1000 tons a day.

Falmouth, Ky., has sold $3000 of bonds for improving its waterworks and its electric light plants. The mayor is in charge.

The Southern Cereal Company, Hopkinsville, Ky., has been incorporated with $50,000 capital stock by T. L. Evans, Thomas P. Cook and O. F. Tutt, and will establish a grain mill.

Buckhorn College, Buckhorn, Ky., is installing an electric light plant, and will be a buyer of supplies hereafter.

George W. Gilbert, Whitesburg, Ky., will install a spoke mill.

The Public Service Company, Livermore, Ky., has been organized by W. S. Trunnell and A. M. Hackett, who have purchased the electric light plant of the Smith Cooperage Company. It will be enlarged and improved and day service provided. A pump with a capacity of 500 gal. per min. is to be purchased.

The Davidson, Green & Hicks Lumber Company, Nashville, Tenn., has purchased 44,000 acres of timberland at Cowan, Tenn., and will install a large sawmill there early in the spring.

The Southern Engine & Boiler Works, Jackson, Tenn., has increased its capitalization from $300,000 to $400,000. F. W. Milbourn is general manager.

Stanyarne Little, Johnson City, Tenn., has interested North Carolina cotton manufacturers in the establishment of a $500,000 mill at Johnson City. The mill will have 2500 spindles. Archibald B. Calvert, Spartanburg, N. C., is one of those interested.

George H. Guthrie, Central avenue and Blythe street, Memphis, Tenn., has begun the construction of an ice and cold storage plant.

The Chattanooga Stamping & Enameling Company, Chattanooga, Tenn., has elected officers. William Lipphardt is president; C. H. Huston, vice-president; Louis Lipphardt, secretary and treasurer, and Charles Lipphardt, general manager. Gas heaters and other sheet metal products will be manufactured in the new plant, contracts for the erection and equipment of which are now being let. Temporary offices are at 1127 Market street.

Semons & Harrison, Union City, Tenn., will be in the market for automobile repair shop equipment.

The Auto Cold Storage Company, Nashville, Tenn., has been incorporated with $100,000 capital stock to manufacture a device for cold storage purposes. C. C. Norton and William Peake are among the stockholders.

It is reported that the Clinchfield Mineral & Milling Corporation, Erwin, Tenn., will build an additional mill to grind low-grade fluorspar. It recently increased its capitalization from $300,000 to $750,000.

J. B. Sells and M. F. Miller, Johnson City, Tenn., will establish a sawmill.

Pease & Dwyer, Memphis, Tenn., will build a feed mill.

S. A. Dunwoody, South Pittsburg, Tenn., has plans for the establishment of a flour mill at a cost of $10,000.

Isaac Fass, Portsmouth, Va., will build a two-story brick ice and cold storage plant, 40 x 90 ft., at an estimated cost of $25,000. The capacity will be 25 tons of ice a day.

The Bedford Pulp & Paper Company, Richmond, Va., is completing the construction of a plant at Big Island, Va., with a capacity of 70 tons a day. It is 200 x 900 ft., and represents an investment of $500,000.

Bridgeport, W. Va., has voted $23,500 of bonds for improving the water system, etc.

F. O. Trump, Kearneysville, W. Va., is in the market for a gasoline hoist with a load capacity of 1200 lb.

The Williamson Light & Ice Company, Williamson, W. Va., is in the market for a 72-in x 18-ft. return tubular boiler. O. B. Welch is general manager.

Birmingham

BIRMINGHAM, ALA., February 1, 1915.

Machinery and machine-tool dealers report an increase in inquiries; but an equally continuous slowness to close contracts. The second-hand machine men report a fair business. The free movement of cotton has increased the general volume of money in circulation, but no distinct improvement has taken place, and none is in sight.

The Anniston Electric & Gas Company, Anniston, Ala., contemplates improvements to its plant, but details have not been announced. E. S. Genter, Jr., purchasing agent of the Alabama Power Company, Birmingham, has the details.

W. G. Lunsford and J. G. Shannon, Birmingham, have bought the Oak Leaf Coal Company and plan developments.

Armour & Co., Macon, will build a cold storage plant to cost $50,000.

The Central Fertilizer Company, Macon, Ga., will rebuild its mixing plant, recently burned.

The Farmers Gin & Fertilizing Company, Blythe, Ga., has been incorporated with a capital stock of $10,000 and will establish a flour mill.

The City Council, Toccoa, Ga., has purchased water power site and will establish a hydroelectric lighting plant, etc.

The Mangis Company, Atlanta, Ga., has been incorporated by F. E. Beal, H. N. Randolph, R. S. Parker, and others, with a capital stock of $100,000 to manufacture metal products.

The Amesbury Mfg. Company, Amesbury, Mass., has purchased a site at St. Petersburg, Fla., and will establish a plant for the manufacture of automobile parts.

The Mutual Railway, Light & Power Company, Safety Harbor, Fla., has been incorporated with a capital stock of $15,000 to establish a railroad and power plant. S. J. Talmage, George Booth, Sr., and G. O. Lohmeyer are among the stockholders.

The Spartanburg Roller Mills Company, Spartanburg, S. C., has been incorporated with a capital stock of $10,000 by N. L. Bennett, J. T. Blackwell, and others.

Robert Rainey, Thomasville, Ga., contemplates the establishment of a trunk factory at Gainesville, Ga.

The Altamaha Sand & Gravel Company, Atlanta, Ga., has been incorporated by J. A. and W. H. Piper, and others, with a capital stock of $15,000 and authorization to increase it to $50,000.

Texas

AUSTIN, TEXAS, January 30, 1915.

Trade conditions are unchanged. In southern Texas spring industrial activities will begin early in February and it is expected the demand for irrigation machinery and various lines of tools will soon show a substantial increase. Business conditions generally continue to show an improvement.

Thomas Barbuzza, Ft. Worth, will build a garage and machine shop to cost about $10,000.

The Green Machinery & Development Company has been organized at Plainview. G. E. Green is interested.

The Yoakum Power, Light & Water Company, Yoakum, will install a 500-hp. Diesel type oil engine.

The Compania Minera La Amistad, S. A., Sombrerete, state of Zacatecas, Mexico, will purchase an air compressor, air drills, machinery and equipment for an electric light and power plant and other machinery for its mines. Captain Richard Williams is manager.

The Texas Power & Light Company, Austin, will install a 2000-kw. generator in its power station at McKinney.

The Ziegler Stove Company, Wichita Falls, has been incorporated with a capital stock of $25,000 for the purpose of building a stove foundry. J. C. Ziegler is one of the stockholders.

The Hills, Sutton & White Mfg. Company, Myrtle avenue and Dallas street, El Paso, Texas, manufacturer of tanks, pipe, etc., is a continuation of the business of the Southwestern Metal Mfg. Company, Albuquerque, N. M. It is incorporated with a capital stock of $20,000, and has purchased a site for a factory, which will be erected shortly. The manufacture of silos and irrigation pipe will be a specialty, and the company is in the market for a full line of irrigation pipe machinery, a few small power tools, such as a multiple punch, a small press, etc. R. B. Sutton is manager.

The Arctic Iceless Refrigerator Company, Silver City, N. M., will build a plant for the manufacture of refrigerators.

St. Louis

ST. LOUIS, MO., February 1, 1915.

It continues to be a case of steady though slow improvement in the machine-tool market at this point. Transactions are increasing and more and more business is coming into sight. It remains of the single tool and replacement character, with some slight evidence of extension and new enterprise. No one industry seems to be more prominent than another in buying. The cotton section is reporting easier money. This, it is argued, means freer trade during the spring buying season than has been anticipated. Collections are satisfactory for the most part. Second-hand machinery is in light request.

The United States Mfg. Company, St. Louis, has been incorporated with a capital stock of $30,000 by E. J. Hudson, H. C. Harton and R. M. Zeppenfeld and will engage in specialty manufacturing, mostly of woodenware articles.

The Magnus Metal Company, St. Louis, has been incorporated with a capital stock of $150,000 by F. A. Craft, A. H. Prater and L. J. Lyon.

The Double Tread Tire Company, St. Louis, has been incorporated with a capital stock of $12,500 by Oscar F. Wright, Jacob J. Wohlgemuth and Clyde E. Buecher and others.

University City, Mo., a St. Louis suburb, will expend about $100,000 under a bond issue, on the equipment of a municipal electric light plant.

The Motor Car Repair & Supply Company, St. Louis, has been incorporated with a capital stock of $12,000 by Frank Schneider, A. B. Hoffman and F. W. Kretschmar.

A branch of the Ford Motor Company, Detroit, at St. Louis, utilized for assembling cars, will be enlarged in capacity at once and will receive new equipment which is being sought.

The Prairie Pipe Line Company of Kansas, Independence, Kan., has been granted permission by the Secretary of State of Missouri to utilize $6,300,000 of its $27,000,000 capital in Missouri to equip and operate pipe lines, pumping stations, etc. About $3,000,000 is to be expended at once on new pumps and piping.

The Lee Jordon Lumber Company, Jefferson City, Mo., has been incorporated with a capital stock of $33,500 by Lee Jordan, Joseph Pope and W. C. Irwin, and will install a planing and sawmill.

The Southwest Automobile & Supply Company, Springfield, Mo., has been incorporated with a capital stock of $25,000 by H. F. Fellows, F. J. Curran and H. B. McDaniels.

Morrison, Mo., will install electric generating and distributing equipment for light and power. The mayor is in charge.

The St. Mary's Machine & Engine Company, St. Mary's, Ohio, will build a shop at St. Charles, Mo., at once, and will remove there May 1. It will also add to its equipment.

The Junge Baking Company, Joplin, Mo., will equip a $50,000 addition to its plant under the supervision of the C. P. Cooley Company, Pittsburgh, Pa., which may be addressed.

The Campbell Baking Company, Kansas City, Mo., will equip a bakery to cost $40,000, and is in the market for power plant equipment, etc.

Glasgow, Mo., will install a centrifugal pump direct connected to an electric motor, capacity 432,000 gal. a day, against a 50-ft. head. R. L. Blacet is superintendent.

V. Gueringer, 219 Missouri avenue, Kansas City, Mo., is reported in the market for power equipment, etc.

The Arkansas Power Company, Malvern, Ark., will acquire the plant of the Co-operative Electric Light Company, Newport, Ark., and will improve the equipment of both the electric light plant and the waterworks.

The Co-operative Cold Storage Company, Leslie, Ark., of which A. C. Edwards is manager, will install ice-making machinery, refrigerating apparatus, etc.

F. H. Dyer, Tulsa, Okla., will install power and mining equipment on ore property in Arkansas.

The Acme Device Mfg. Company, Hot Springs, Ark., has increased its capital stock from $15,000 to $30,000.

The Arkansas Power Company, Arkadelphia, Ark., will install two pumps of 1,000,000-gal. capacity and filtering equipment.

The Arkansas Water Company, Little Rock, Ark., will install equipment and sink wells of a daily capacity of 5,000,000 gal.

The Luxora Water & Light Company, Luxora, Ark., will add equipment to the waterworks plant. C. B. Wood is general manager.

The Union Sheet Metal & Plumbing Company, Bartlesville, Okla., has been incorporated with a capital stock of $15,000 by C. J. Cottrell, Orin Weaver and T. L. Enoch.

The Alex H. Kerr Glass Company, Sand Springs, Okla., will add to the capacity of its fruit jar blowing plant.

A brush factory of undetermined capacity will be equipped at Tulsa, Okla., by the North Ridge Brush Company, Freeport, Ill.

Street & Co., Clarksdale, Miss., are reported in the market for boilers, engines, etc.

The Canton Box Factory, Canton, Miss., will install about $10,000 worth of machinery in its box factory. Homer Rhymes is reported to be one of the principal stockholders.

The Canal Lake Stave & Lumber Company, Minter City, Miss., has been incorporated with a capital stock of $10,000 by C. M. Davis, J. J. Jones, and others, and will install equipment.

The Batesville Fibre Company, Batesville, Miss., has been incorporated with $30,000 capital stock as the successor to the Panola Cordage Company. It will install some new equipment.

The Sea Food Company, Biloxi, Miss., will install an ice-making plant of about 30 tons daily capacity, etc.

The Holland Ice Company, Clarksdale, Miss., will enlarge its capacity, adding equipment to about double its present capacity.

The Louisiana Railway & Navigation Company, New Orleans, La., of which William Edenborn is president, will equip a grain elevator and terminal facilities, involving about $750,000.

The Acadia Parish Fifth Ward, Drainage District No. 1, Estherwood, La., is in the market for dredging machinery.

C. N. Adams, Alexandria, La., will rebuild its brick plant recently burned with a loss of $12,000.

The Johnson Ice & Light Company, Winnfield, La., has bought the plant of the Winnfield Ice & Light Company.

The Pacific Northwest

SEATTLE, WASH., January 26, 1915.

The machine-tool trade has made little headway. A few more inquiries are appearing, but are mostly for equipment of an unimportant nature. Mill and logging machinery remains rather dull, though the lumber industry is getting more foreign business. The interior is now beginning to show the financial effect of the heavy movement of grain, etc., resulting in increasing demand for equipment of a miscellaneous nature. Business is somewhat retarded by seasonable weather conditions. The improved position of copper is bringing a little more life to the mining and smelting industires. Numerous orders for cannery equipment are coming from Alaska and local salmon interests. Public improvements continue to be a factor of some importance and the improving bond market is bringing about more activity in municipal work.

The Eureka Woolen Mills, Eureka, Ore., have been leased by R. E. Bedillion, Bandon, Ore., with an option to buy the plant. Improvements will be made, and the new owner will be in the market for machinery.

The Gravity Plumb Level Company, Boise, Idaho, recently incorporated, will erect a factory to manufacture a patented plumb level. W. L. Gifford is president.

Plans for a two-story concrete addition, 84 x 104 ft., to the plant of the Doernbecker Furniture Mfg. Company, Portland, Ore., have been completed. Later it will erect a six-story concrete addition. New machinery will be purchased.

The mill of the Mountain Timber Company, Kalama, Wash., recently destroyed by fire, will be rebuilt. The new mill will have a capacity of 250,000 ft. daily, and is estimated to cost $300,000.

The Lakeside Lumber Company, Spokane, has been reincorporated under the name of the Home Lumber Company, with a capital stock of $50,000, and plans the reconstruction of its plant on a much larger scale.

The Laminated Steel Company, Seattle, will install a branch plant in New Westminster, B. C. J. S. Davidson is the New Westminster representative.

Lyman Fargo, Pocatello, Idaho, and others, have incorporated the Pocatello Cold Storage Company with a capital stock of $50,000, and will convert a brewery into a cold storage plant.

The Great Western Pump Company, Portland, has been incorporated with a capital stock of $50,000, by T. A. Bateman, W. B. Campbell and S. F. Wilson.

The Succor Creek Irrigation District, Vale, Ore., has been organized to irrigate about 8000 acres of land. It is planned to build a pumping station. J. S. Wheeler, Vale, is president.

The flour mill of the Rexburg Milling Company, Rexburg, Idaho, which was recently burned, with a loss of $60,000, will be rebuilt.

The Granite Mining Company, Valdez, Alaska, plans to spend about $20,000 in improvements, including the construction of a steam power plant.

An irrigation and power dam, estimated to cost $10,000, will be built by the Neenah-Oregon Land Company, Riddle, Ore. It plans to ultimately develop power for the operation of pulp mills which they plan to construct. I. P. Gardner is manager.

The Deep Sea Salmon Company, Smith Building, Seattle, is having plans prepared for a canning plant which it will build at Knik, Alaska, to cost approximately $50,000.

Aberdeen, Wash., is taking bids for a horizontal centrifugal pump of 2800-gal. per min. capacity against a 240-ft. head, direct-connected with a steam turbine engine.

Eastern Canada

TORONTO, ONT., February 1, 1915.

War orders are still the outstanding feature of the industrial situation in Canada. Several additional large orders have been placed with Canadian manufacturers by the representative of the British Government, whose headquarters are in Montreal. One of these was for $9,000,000 worth of clothing.

One machine shop in Toronto will have to expend about $200,000 in new machinery. It is estimated that since the war broke out the Imperial Government has placed orders in Canada for over $85,000,000 worth of material and equipment. These war orders are greatly contributing to the restoration of business confidence, particularly in view of the expectation that additional ones will follow.

Most of the chartered banks of Canada have recently held their annual meeting and the financial statement presented in each instance was of a most gratifying nature. In nearly every instance the usual dividend was paid and large sums placed to the reserve account.

The Canadian Bed Company, Chesley, Ont., has obtained an order for 25,000 shrapnel shells, and will install $12,000 worth of new machinery.

Batch & Rippin, Falkirk, Ont., are to erect a plant for the manufacture of cement tiles, etc.

The Canadian General Electric Company, of Peterborough, Ont., is to spend $150,000 for a new plant and equipment for the manufacture of railroad cars.

The United Gas & Fuel Company, Ltd., Hamilton, Ont., has increased its capital stock from $500,000 to $1,000,000.

The Niagara Dredging Company, dredging contractor, etc., St. Catharines, Ont., has been incorporated with a capital stock of $40,000 by J. S. Campbell, C. Bowman and H. M. Campbell.

The Electric Metals, Ltd., Welland, Ont., is to make additions to its plant and install new furnaces.

The buildings of the Superior Rolling Mills Company, Ltd., Port Arthur, Ont., have been erected and the heating furnaces are being installed; but the plant will not be ready for operations until later.

Sub-contracts for a steel crane for the new pump house at Montreal will be given out shortly.

The Butterick Publishing Company, New York, is to erect a factory and warehouse on Wellington street, West, Toronto, at a cost of $1,000,000. L. S. Yolles is the contractor.

The Canadian Northern Quebec Railway, Toronto, Ont.,

has obtained a permit to erect a round house and machine shop in Montreal. L. W. Mitchell is purchasing agent.

The General Canning Company, Montreal, is to erect a new plant. Canning and power plant machinery will be required.

The New Brunswick Pulp Mills, Newcastle, N. B., whose plant was recently destroyed by fire, will rebuild on the Miramichi River, either at Newcastle or Millerton.

The Dennis Wire & Iron Company, London, Ont., has purchased a factory and will make alterations. E. R. Dennis is manager.

Pelee, Ont., proposes to install a boiler in the pumping station for drainage work. Alexander Baird, Erie street, Leamington, is the engineer.

The Ingersoll Machine Company, Ingersoll, Ont., has been incorporated with a capital stock of $40,000 by L. A. David, L. A. Maihiot and S. H. R. Bush, Montreal.

The Exolon Company, manufacturer of artificial abrasives, Thorold, Ont., plans to build an addition to its factory at a cost of $20,000. C. J. Brockbank is manager.

Drummond Brothers, Midland, Ont., have leased the Georgian Bay Engineering Works, which have been idle for some time and operations will be resumed. J. J. Drummond is manager.

The Auto Heater Company, Ltd., Toronto, has been incorporated with capital stock of $150,000. It will manufacture auto heaters and heating devices for carriages.

Newmarket, Ont., is to spend $15,000 for equipment for a municipal electric light and power plant.

A factory to cost $20,000 is to be erected by the Brantford Scale Company, Brantford, Ont. J. L. Howard is manager.

The Chatham Packing Company, Ltd., Chatham, Ont., has been incorporated with a capital stock of $400,000 to take over the business of the O'Keefe & Drew Abattoir Company.

The Kaufman Rubber Company, Ltd., Berlin, Ont., has been incorporated with a capital stock of $2,000,000.

Plans are nearly completed for a dry dock for Halifax, N. S. It will be 1150 ft. long and 180 ft. wide and will be adapted for repair work on ships of the Royal Navy. The estimated cost is $3,000,000.

The factory of the Rudd Paper Box Company, Toronto, was destroyed by fire January 27 with a loss of $150,000. The equipment destroyed is valued at $75,000.

Western Canada

WINNIPEG, MAN., January 22, 1915.

The Prenderville Brick & Terra Cotta Company, Ltd., Calgary, Alberta, has been incorporated with a capital stock of $500,000.

It is announced that the Quaker Oats Company, Saskatoon, Sask., will make additions to its plant.

J. C. Boyle, Calgary, Alberta, is interested in a local company that will erect a $1,000,000 packing plant for which the site has been secured.

Hind, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $50,000 to build ships, docks, etc.

Fire destroyed the elevator of the Winnipeg Elevator Company, Indian Head, Sask., with an estimated loss of $75,000.

Government Purchases

WASHINGTON, D. C., February 1, 1915.

Sealed proposals will be received by the lighthouse inspector, Ketchikan, Alaska, until 2 p. m., March 10, for furnishing two internal combustion engines and air compressors, and two internal combustion hoisting engines for Cape St. Elias light station.

The U. S. Reclamation Service, 605 Federal Building, Los Angeles, Cal., will receive sealed proposals until 2 p. m., February 12, for furnishing electrical apparatus for a small power plant for the Elephant Butte dam, Rio Grande project, N. M.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, January 26, Schedule 7722, construction and repair, class 1, for one angle-bar planing machine for Boston: Hilles & Jones Company, $2000.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, February 16, schedule 7861, for two fire-tube boilers for Port Royal, S. C.; schedule 7865, eight water-tube boilers for Boston and Brooklyn; schedule 7862, one pneumatic compression yoke riveter, and schedule 7875, eight handy billy pumps, all for Norfolk; until February 23, schedule 7867, one vertical simplex pump for Puget Sound; schedule 7896, one 1-ton trolley hoist for Newport; until February 27, schedule 7895, miscellaneous hydroaeroplanes and power plants for Pensacola.

Trade Publications

Milling Machines.—Hendey Machine Company, Torrington, Conn. Catalogue. Presents illustrated descriptions of a line of Lincoln milling machines, which are made in a number of different sizes for handling various classes of work. Both standard and special machines are shown, and in the case of the latter, a brief statement of the points of difference between them and the corresponding standard sizes is given. The different types of drive that can be used are also illustrated and briefly described. A special feature of the catalogue is a set of illustrations covering some 20 pages of practical examples of work done by these machines.

Forging Machines.—National Machinery Company, Tiffin, Ohio. Forging machine talk No. 6. Concerned with the company's friction-slip flywheel for use on forging machines. The special advantage claimed for the use of this flywheel that strains on the shaft, bed and working parts of the machine are eliminated as the wheel slips if the machine should become stalled. A drawing showing the construction of the wheel which is clamped between two friction collars or flanges is presented together with an engraving showing its application to a machine.

Planing Machines.—Morton Mfg. Company, Muskegon Heights, Mich. Bulletin No. 8. Covers a line of draw-cut planing machines with traveling heads that can be employed for either boring or milling. The special features of the machine are less floor space and power than one of the housed type and the ability to use it as either a portable or a stationary tool. A general description of the machine, which is built with strokes of 48, 60, 72 and 84 in. and any length of bed, is presented, the text being supplemented by numerous engravings showing various sizes of machines in use for different operations.

Power Pumps.—Lucas Pump Company, Dayton, Ohio. Pamphlet. Mentions the various kinds of power pumps that can be supplied for general service, deep well work, boiler feeding and handling corrosive fluids. There is practically no text in the folder, illustrations with condensed tables of specifications and a brief general description of all the pumps being relied upon to tell the story.

Combination Grinding Machine.—Challenge Machine Company, Inc., 5116 Springfield avenue, Philadelphia, Pa. Circular. Treats of a wet tool and dry grinding machine with wheel guard. One of the special features of the machine is that it is a combination of units which can be varied as desided to change the arrangement of drive, wheels, guards, etc. Illustrations of the several units and some of the various combinations that can be supplied are presented, together with tables of weights, dimensions, etc. An illustrated description of one of the combination wet and dry machines appeared in *The Iron Age*, Octobed 8, 1914.

Centrifugal Pumps.—Terry Steam Turbine Company, Windsor street at Windsor avenue, Hartford, Conn. Bulletin No. 19, superseding No. 9. Size, 6 x 9 in.; pages 64. Gives details and data on various turbo-pump applications. The principles of operation and construction of the centrifugal pump are explained, together with the details of the turbines used for driving them, special attention being called to the economy in floor space effected by the use of a turbine in place of a reciprocating engine. The service conditions for the pumps listed vary from large volumes of water pumped against low heads, such as circulating water for condensers, up to high head work, such as boiler feed or fire service. The description of the pump is supplemented by numerous engravings of the different parts, while illustrations of the various pumps and tables of dimensions are scattered through the bulletin, the former in many cases being views of actual installations. Instructions on testing centrifugal pumps and a number of tables of useful information are included.

Storage Battery Industrial Truck.—Cowan Truck Company, Holyoke, Mass. Circular. Refers to the Cowan storage battery automatic transveyor, which is an elevating industrial truck that was illustrated in *The Iron Age*, October 15, 1914. A description of the transveyor and how it operates is presented, together with illustrations of it in use and a condensed table of specifications.

Steel Pulleys.—American Pulley Company, Philadelphia, Pa. Collection of circulars. Pertain to a line of split steel pulleys having a grooved face to permit the air between the belt and the face of the pulley to escape. The advantages of these pulleys, such as transmission of more power and a decrease in the amount of power required to drive the pulleys are touched upon briefly, and the stock sizes that can be supplied are mentioned. Attention is directed to the company's exhibit at the coming Panama-Pacific International Exposition, and an engraving of a standard pulley is presented.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

ASSAULT BY SUPERINTENDENT.—A foundry company, or other employer, is liable for a wrongful assault and battery committed upon an employee by his superintendent, if it was committed in the line of employment, but not if the affair was a purely personal one between the two men. (Alabama Supreme Court, Laird vs. Central Foundry Company, 60 Southern Reporter 571.)

TIME FOR DELIVERY OF GOODS SOLD.—When no time is specified for delivery of goods sold, and especially when they are to be specially manufactured, the seller cannot be put in default in the matter of delivery until the buyer gives notice that it must be made. (New York Supreme Court, Robinson Clay Products vs. John H. Thatcher & Sons, 150 New York Supplement 658.)

RECIPROCAL RIGHTS OF EMPLOYER AND EMPLOYEE.—The legal right of a manufacturer to maintain an open shop is equally as strong as the right of union workers to refuse to work in such a shop. (New York Supreme Court, Garside vs. Hollywood, 150 New York Supplement 647.)

WAIVER OF RIGHT TO EXCLUSIVE AGENCY.—A firm which acquired what purported to be an exclusive right to sell a certain manufacturer's products in certain territory for a given time may be found to have waived the right to monopolize the territory through having made settlements with the manufacturer without claiming deductions because of sales made by another licensee in the same territory. (United States District Court, Eastern District of Pennsylvania, Kemp & Burpee Mfg. Company, 215 Federal Reporter 935.)

MANUFACTURER'S LIABILITY TO BUYER'S EMPLOYEES.—A manufacturer who rebuilt and sold a die-cutting machine is liable for injury to an employee of the buyer, while operating the machine, if the accident directly resulted from any negligence in failing to make the machine reasonably safe for use, unless the employee was aware of its defective condition or was guilty of contributory negligence. (United States Circuit Court of Appeals, First Circuit, Tom vs. Nichols-Fifield Shoe Machinery Company, 215 Federal Reporter 881.)

PROMISE TO REPAIR APPLIANCE AS AVOIDANCE OF ASSUMPTION OF RISK.—A member of a crew of molders in a foundry did not assume the risk of being injured through use of a defective flask, if he relied on a promise which had been made to the crew a few hours before by the superintendent that the defect would be remedied, and believed that the repair had been made. (Naylor vs. Frick Company, 56 Pennsylvania Superior Court Reports 165.)

MACHINERY SALES AGENT'S RIGHT TO COMMISSION.—One who had a contract for commissions on all machinery sold for installation within his territory, whether the inquiries should come through him or the employing manufacturer, it being understood that he should forward any inquiries received by him for installation of machinery outside his territory, was not entitled to a commission on machinery sold directly by the manufacturer to a concern which had its main office within the territory, where the machinery was installed outside. (New York Supreme Court, McGann vs. Ruggles-Coles Engineering Company, 149 New York Supplement 698.)

DEFAMATION OF PRODUCTS.—A false statement which imputes want of integrity in a manufacturer or dealer in his business transactions is actionable without specific proof that he has been actually injured thereby; and a false statement concerning the quality of his products is actionable without such proof, if the charge necessarily disparages the manufacturer. But there is no right of action for a false statement concerning the quality of a product, if it does not necessarily disparage the manufacturer, unless he proves that he sustained damage in consequence. (Maryland Court of Appeals, Hopkins Chemical Company vs. Read Drug & Chemical Company, 92 Atlantic Reporter 478.)

EXCESSIVENESS OF RECOVERY FOR INJURY.—The award of $7054 was not excessive recovery for injury to a machinist resulting in loss of the sight of an eye, if his employer was responsible for the accident. (St. Louis Court of Appeals, Sterling vs. Parker-Washington Company, 170 Southwestern Reporter 1156.)

RELEASE OF PERSONAL INJURY CLAIMS.—An injured worker who has signed a written release of all claims against his employer will not be permitted to avoid the effect of the release on the ground that he did not understand the nature of the instrument when he signed it, if he was capable of understanding it, and no fraud was practiced upon him. (Wisconsin Supreme Court, Rayborn vs. Galena Iron Works Company, 149 Northwestern Reporter 701.)

DUTY TO WARN INEXPERIENCED EMPLOYEES.—An employer who permits an inexperienced employee to be set at work at a dangerous machine without instruction how to avoid incidental dangers of injury is liable for an accident attributable to such neglect. (Massachusetts Supreme Judicial Court, Ponta vs. New Bedford Cordage Company, 106 Northeastern Reporter 1004.)

WHEN RISK IS NOT ASSUMED BY MACHINE OPERATOR.—An employee who had worked at an inclinable punch press only a few minutes before being injured did not assume the risk of injury arising from a defective adjustment of the machine. (New York Supreme Court, Appellate Division, Cleary vs. R. E. Dietz Company, 149 New York Supplement 958.)

HERNIA AS ACCIDENTAL INJURY.—Hernia sustained by an employee in moving a heavily loaded truck in the course of his employment constitutes an injury subject to an award under the Washington workmen's compensation act. (Washington Supreme Court, Zappala vs. Industrial Insurance Commission, 144 Pacific Reporter 54.)

AUTHORITY OF SALESMAN TO WAIVE AGREEMENT.—A salesman of machinery who is shown to have had authority to enter into certain agreements in a sale will be deemed to have had authority to afterward waive performance thereof on the buyer's part. (United States Circuit Court of Appeals, Ninth Circuit, Fairbanks, Morse & Co. vs. Nelson, 217 Federal Reporter 218.)

IMPLIED WARRANTY OF GAS ENGINE.—A manufacturer of gas engines who sells one to be used by the buyer for a particular purpose known to the manufacturer impliedly warrants that the engine is reasonably well adapted to such use. And this is so, although there is an express warranty as to workmanship and materials. Such express warranty does not exclude the implied warranty of the engine as being suited to the buyer's known requirements. (Indiana Appellate Court, Pennsylvania American Plate Glass Company vs. De La Vergne Machinery Company, 106 Northeastern Reporter 722.)

EMPLOYER'S LIABILITY CONCERNING TOOLS.—When an experienced workman is injured through the flying of a particle of steel from the battered head of a chisel, on its being struck by a hammer in the course of work, the employer cannot be held responsible for the accident on the theory of negligent failure to inspect the tools, or careless omission to warn the employee against the danger; such danger being one of the obvious risks of employment which are impliedly assumed by the worker. (Maine Supreme Judicial Court, Cooney vs. Portland Terminal Company, 92 Atlantic Reporter 178.)

ASSUMPTION OF RISK BY FOUNDRY EMPLOYEE.—An employee engaged in assisting in carrying a ladle in a foundry assumes the risk of being injured through stumbling over a molding board, due to defective lighting of the place. (Wisconsin Supreme Court, Pawalowski vs. Hartford Plow Company, 149 Northwestern Reporter, 221.)

RISK NOT ASSUMED BY LATHE OPERATOR.—An operator of a lathe did not assume the risk of being injured through his thumb being caught in the unprotected speed gear, merely because he remained at work four hours beyond the time when he had been assured that the defective condition would be remedied. (Haber vs. W. A. Jones Foundry & Machine Company, 184 Illinois Appellate Court Reports, 70.)

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